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SOCIAL PSYCHOLOGICAL FACTORS
IN THE PREDICTION OF DELINQUENCY

by

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A THESIS

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The undersigned certify that they have read,
and recommend to the Faculty of Graduate Studies for
acceptance, a thesis entitled Social Psychological
Factors in the Prediction of Delinquency submitted
by Melanie Logan Lautt in partial fulfilment of the
requirements for the degree of Master of Arts.

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ABSTRACT

The purpose of the study was systematization of delinquency theory through the development of a prediction instrument. The seven social-psychological variables composing the instrument were chosen because each plays a central role in delinquency theory and because they can all be subsumed under one theoretical framework. Differential weighting of the variables according to their hypothesized influence, and combination of the variables by a multiplicative rather than additive technique, were two methods used to incorporate into the prediction device, the dynamics of interdependence or interaction among the variables.

The sample (non-random) consisted of 200 basically lower-class males, aged 13 to 15 years, all of whom lived in or around four low-rental housing projects in the city of Seattle. Part of the data was gathered by the administration of a questionnaire to the boys, and teachers, school disciplinary records, and police records were sources of the remaining data.

A preliminary model (Model B) was developed using variables measured at the beginning of a project in which the subjects were involved. Using this model, predictions concerning the future delinquency involvement of the subjects were made. The correctness of these predictions was then evaluated or tested by comparing the predictions to the subjects' actual

future delinquency involvement, a measure of number of contacts with the police taken three years after the beginning of the project (after the earlier measures).

It was found that the preliminary model, Model B, was both accurate and efficient, discriminated between mild and serious delinquency, and predicted better than any of the single variables of which it was composed. Attempts to improve upon Model B, including changes in the weighting system and in the combination of variables, all failed. Tests of interaction were carried out to discover instances where the relationship between any of the variables and delinquency might be influenced or changed by the presence of any of the remaining variables in the model. (The presence of a variable can weaken the influence and thereby weaken the predictive capacity of another variable with which it interacts.) Three cases of interaction were found, and 'controlled for' in a final modification of Model B. This last attempt produced an improved device (higher accuracy, equal efficiency, higher predictive power, and greater discrimination between mild and serious delinquency). Hence, it was accepted as the final and best prediction instrument. The last step in the study involved a comparison of predictions made using our theoretically-based model, with predictions made using the statistically 'best-fitting' equation for the sample, computed through the method of Stepwise Regression analysis.

Following a summary, several shortcomings of the

study are outlined, and the general implications of prediction devices, such as the one developed in the present study, are discussed.

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CHAPTER ONE

THE PRESENT STATE OF CRIMINOLOGY

With characteristic British conservatism, Gordon Trasler (1964:422) has recently stated that

"...criminology is at present a somewhat untidy discipline."

However, this situation is not due to a paucity of theory, but due to an overabundance of univariate theoretical systems, each seeming to effectively explain only certain aspects of deviant behavior, yet not co-ordinated into a comprehensive theoretical system able to account for the immense range and complexity of behavioral facts.

Some writers have maintained that one of the major problems in bringing about a more compact, yet inclusive criminology stems from the professional conflict between the various areas of the humanities, especially sociology and psychology; a conflict which prevents the interaction and communication necessary for the development of a theory capable of explaining delinquent behavior.

"...many sociologists, working in criminology, have still not been fully aware of a need for a more systematic approach to deviant behavior... which would parallel the developments in the social-psychological study of behavior in general."

(Clinard, 1957:466)

The inadequacies of strictly psychological or sociological theories are demonstrated respectively by a) the existence of individuals with similar 'problem'

personalities who engage in different behavior, and by b) the existence of both delinquent and non-delinquent individuals living under equally 'deprived' social conditions. In other words, neither category has sufficiently explained, on its own, the range of possibilities involved in delinquent behavior.

Inkeles has offered a solution to this dilemma.

"Our criterion should be not disciplinary purity, but rather the adequacy of our analysis....I would assert that very little sociological analysis is ever done without using at least an implicit psychological theory. It seems evident that in making this theory explicit and bringing psychological data to bear systematically on sociological problems we cannot fail but improve the scope and adequacy of sociological analysis."

(Inkeles, 1959:250)

The appeal in sociology today is for inclusiveness, rather than ideological purity. However, simply adding variable upon variable, as results from the method of factor analysis, is appropriate only in the exploratory stages of a study, and can only handle variables on the same conceptual level (since there is no specification of dependent or independent variables). We have reached the stage in criminology where we must now begin to consider the interrelationships between the many factors which the exploratory studies and strictly theoretical attempts have defined. For instance, we now know that variables X, Y, and Z are related to delinquency. But we can no longer be satisfied with such multi-factor lists. What we must now discover is:

- a) to what degree variables X,Y, and Z affect delinquency
- b) under what conditions variables X,Y, and Z affect delinquency.

These specifications bring us to the study of 'interaction'. A statistician's term, interaction means simply that the relation between two variables depends on the value of a third variable. In contrast to addition of the variables, this relation implies the need for a multiplicative model, in which the effect of one independent variable on the dependent variable depends on the value of a third independent variable (or a fourth or a fifth etc.). The next logical step in the study of delinquency, then, is to study the interaction of the several variables from different conceptual levels which have been singularly linked to delinquency.

In order to achieve this, a predictive instrument will be developed, which will allow us to test the interaction found. We will

- a) examine the interaction effects of several factors related to delinquency, and
- b) attempt to discover if the theoretical and methodological merging of these variables can increase predictive efficiency without becoming unprincipled eclecticism.

The basic purpose is to synthesize present thinking on delinquency through the construction of a prediction instrument.

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PREDICTING DELINQUENCY: PROBLEMS AND PROSPECTS

Some General Issues: In general, effective prediction is thought to represent a high level of maturity in any empirical field (Gould and Schrag, 1962:68), an idea based primarily on the acceptance of the fact that prediction is the ultimate test of the pragmatic usefulness of the underlying theory involved.

"If you call into question the legitimacy of confirmation following on success in prediction, or of disconfirmation following on failure in prediction, you strike at something very fundamental indeed in science."

(Roger Buck, 1968:441)

Ideally there should be a close relationship between theory and prediction. Gould and Schrag specify this interdependence in regard to delinquency.

"In prediction, an equation asserts the estimated probability of delinquency by combining variables or assigning weights based on previously observed relationships. Theory construction involves the formulation of a minimum set of postulates (law-like assumptions concerning relations among a few key variables) from which the remaining interrelations can be logically derived."

(Gould and Schrag, 1962:68)

In developing a prediction instrument, then, we are attempting to find a systematization of data, based on the theory which initially motivated the data collection.

Awareness of the following three issues is necessary for a better understanding of the use of prediction.

The first issue concerns a conflict between 'clinicians'

and sociologists. Traditionally, prediction in the area of delinquent behavior has been a popular tool of social workers, probation officers, parole workers etc., who, in their attempts to deal with individual recidivists, bring together factors which they know have been independently linked to group rates of delinquency, and proceed to predict individual recidivism through some intuitive process. This method of prediction has resulted in inconsistency, low accuracy, and low reliability from one case to another, and from one 'clinician' to another. Sociologists have maintained, first, that prediction of individual behavior from research done on group rates is the main source of inaccuracy in clinical prediction. Secondly, the clinician's use of some intuitive process is the major source of inconsistency in clinical prediction. Hence, in order to overcome these weaknesses, sociologists suggest that practitioners should use known group rates to predict the statistical probability of any particular, individual incidence of the behavior in question.

The second controversy, the inevitable result of the first issue, is over the actual, proven effectiveness of statistical vs. clinical prediction. (See Meehl, 1954; and "Symposium on Clinical and Statistical Prediction", 1956.) The statistical method of prediction is based on simple laws of probability, which state that a given fact or observation about an individual will be followed by some other objective observation about the same individual.

The constant addition of observations (or variables) which predict, results in the construction of an actuarial table which then allows the behavioral scientist to estimate the probability that any given individual with any combination of the predictor variables will behave in X manner (ex. become delinquent). The statistical method may be used effectively without recourse to any theory, possibly an advantage. However, once an individual's behavior has been successfully predicted, a theory may be very useful in devising ways of preventing further or potential delinquency.

The older method of the two, clinical prediction, does not make use of any formal quantitative procedure for arriving at probability estimates. Stanfield and Maher (1968:249) distinguish between two definitions of clinical prediction.

- a) That in which the clinician "...has an effective actuarial table 'in his head' even though he may not be aware himself of what predictor variables he is using so successfully."
- b) That in which the clinician unswervingly applies some explicit theory when called upon to predict in a given case.

Type a) differs from statistical prediction only in the explicitness of the actuarial table. Type b) however, suffers from two types of possible errors. Firstly, the theory may be incorrect, and secondly, empirical data related to prediction but unrelated to the particular theory may be either dropped, or ignored. The whole basis of research on statistical prediction has been to

define a more efficient, valid, and reliable method of judgment about future events than that offered by the individual clinician. However, Stouffer (1941) has pointed out that the single advantage in the clinical method lies in the clinician's potential ability to evaluate the interaction among variables. In contrast to the statistical method which treats the weighted variables as independent of one another, simply adding them together to arrive at a cumulative estimate, the clinician can (potentially, at least) weigh the relative significance of the variables i.e. he can assess the way in which one variable may increase or diminish the influence of another variable. It appears then, that the ideal prediction instrument would include the empirical accuracy and consistency of statistical prediction, as well as the ability to assess the dynamic, interactive relationships of the variables.

The third general issue concerns the relationship between prediction and explanation. Although the logical structure of explanation and prediction are the same, with one directed towards past occurrences and the other towards future ones, (Hempel and Oppenheim, 1953:323) it is not necessary that they always occur together. Kaplan illustrates that explanation is possible without predictive ability.

"...a certain neurosis might be explained as the result of a childhood trauma, but not all traumas produce a neurosis in later life; the neurosis is not predictable on the basis only of what serves to explain it.:

(Kaplan, 1964:348)

An illustration of the converse (i.e. prediction without explanation) might be as follows: for certain age groups, foot size is a good predictor of reading ability, yet foot size does not explain variation in the child's ability to read.

"In short, explanations provide understanding, but we can predict without being able to understand, and we can understand without necessarily being able to predict. It remains true, (however), that if we can predict successfully on the basis of a certain explanation we have good reason, and perhaps the best sort of reason, for accepting the explanation."

(Kaplan, 1964:350)

In regard to this third issue, we can compare the two methods of prediction (clinical and statistical). In the past, clinical predictors have claimed to use variables which have evolved from causal laws or theories attempting to explain the phenomenon to be predicted, while statistical prediction has generally involved variables, which have been shown, through multivariate analysis, merely to discriminate between X and non-X, rather than to explain the predicted behavior. Based on the premise that a prediction instrument should use explanatory variables, we should automatically rule out the method of statistical prediction. However, we must face practical barriers. In dealing with human behavior, it is much more difficult to state explanatory causal laws (which must apply in all cases satisfying the specified antecedent conditions) than to evolve explanatory statistical laws, which express only probabilistic trends.

(See Hempel, 1953:323-24 and 1959:275 for further differentiation of these two types of laws.) Causal laws are not the only explanations with predictive capacity: explanatory arguments which account for a phenomenon by showing that its occurrence is highly probable in view of certain existing conditions, (statistical or 'inductive' explanation according to Hempel, 1959:276) also imply that its occurrence could have been inferred or predicted with high probability, at an earlier time, if those same conditions would have been noted. Hence, a useful prediction instrument can be composed of variables drawn from statistical or 'inductive' explanations, and can be based on statistical prediction.

From the above discussion of the general issues, we can arrive at a summary of the characteristics of an ideal prediction instrument.

1. It should be developed on a rate basis, but it should also be applicable to the individual, through the laws of probability.
2. It should demonstrate the reliability and accuracy of the statistical prediction method, but should also be able to evaluate the dynamics of interaction.
3. It should involve variables which are explanatory i.e. those which have been derived from theories or laws which attempt to explain or increase our understanding of the phenomenon to be predicted.

Hopefully, the prediction instrument to be developed in the present context, conforms to all of the above characteristics.

The Role of Prediction in Delinquency Studies: Prediction devices have served one purpose -- to estimate the future, based on present or past events. In the area of delinquency in particular, prediction has served as a basis for future prevention of individual delinquent acts. Studies of prediction have been of two types. (See Rose, 1967, for a review of various attempts at predicting delinquency.)

- a) Those which pertain to potential delinquency of young children (i.e. those which are not officially labelled but are considered to be 'pre-disposed')
- b) Those which predict the reformation of recidivism rates of delinquents already on probation or serving time.

The first type of study has been condemned because of the possibility of the occurrence of the 'self-fulfilling prophecy' (Merton, 1957: chapter 11). or the effect of the 'labelling process' (Becker, 1963). The children chosen for the research may be somehow predisposed towards delinquency merely by their involvement in the study. The second type of study is accepted only with reserve because of the strict (and seldom fulfilled) requirements needed to base public policy on prediction from past to future events.

These requirements are:

1. The observed relations in the original tables must be very high to allow for inefficiencies of false positive and negative forecast.
2. Sampling fluctuations in the original population must be rigidly controlled.

3. The distribution of variables or contingencies must be well known for the population to which the prediction is extended.
4. The conditions under which experience tables were developed or generated must remain similar from experienced population to the predicted population.

(Nettler, 1968; Ohlin and Duncan, 1948-9; Monachesi, 1951)

Because prediction for the use of the prevention of individual delinquent acts has proven weak, Amos and Wellford (1967:29) have suggested that, at the present time, prediction studies may function most usefully in the areas of evaluating the applicability of theories and evaluating the success (or failure) of action programs in delinquency prevention. A good prediction device should enable the researcher to effectively test his theories and action programs, and to decide in which areas action or theoretical development should be intensified or decreased. The prediction device to be developed here will serve the above two purposes. First, the sample of respondents from which the instrument will be developed consists of 200 subjects from a delinquency action program. Hence an evaluation of the instrument will also be a partial evaluation of the action program. Secondly, since the prediction device will involve variables which have each played central roles in different theories of delinquency, its evaluation should also be an indirect evaluation of all these theories. By developing the predictive device on a sample of children, and then testing it by attempting to predict the same sample's delinquency involvement

three years later, (we have measurements of delinquency at time one, and three years later, time two) we have assured that our distribution of variables is well known for the 'population' to which the prediction is extended, and we have reduced the problem of keeping conditions similar from the 'experienced' population to the predicted population.

Possible Methodologies: Today, there are basically two methods of developing a prediction instrument, distinct mainly because of the type of data ('hard' or 'soft') they can handle. The first method involves the following steps. Factor analysis of the sample defines the variables (or factors) which will distinguish X behavior from non-X behavior (i.e. factors which will predict). After a process of correlation and regression analysis (Blalock, 1960: chapters 17, 18, and 19), weights are assigned to the previously chosen 'predictive' variables according to the strength of their relationship with the dependent variable (the variable to be predicted). These weighted variables are then usually linked together in a simple additive model. The measurement problem is particularly relevant here, and cannot be overlooked as a basic weakness. This technique assumes interval or higher level of measurement. However, many researchers use this method with ordinal or nominal data, maintaining that this violation does not result in any major distortions.

The second technique, configurational or pattern-analytic, does not involve the 'level of measurement' problem. (See Short and Strodtbeck, 1965:128-135, Stuckert, 1958.) The method is one of prediction by classification; the researcher divides his data into homogeneous subsamples according to factors he deems related to the dependent variable. It is a process of subdivision of the original sample according to factors which can predict, with a high probability, a single outcome for each subsample. The cases remaining unpredicted from the initial predictor factor, are in turn subdivided according to additional factors, until only a small residual (unpredictable) category remains. Stuckert (1958:231) has outlined the main differences between the two techniques.

1. Method 1 assumes quantitative (hard) data. In method 2, the variables may be qualitative.
2. Method 1 assumes that there exists a single set of predictors or a single set of factor weights that is best for all individuals in the sample. Method 2 does not assume this, but emphasizes the use of distinct homogeneous subsamples. (This results in the major weakness of this method: the need for an exceptionally large sample size.)
3. Method 1 does not inherently allow for the study of interaction between the variables. Method 2 provides for the non-additive, nonlinear interaction of factors i.e. the effect of a factor may depend on the other factors in the configuration.
4. Method 1 assumes that every individual in the population is characterized to some degree by every factor. In method 2, the predictor variables need not be universal throughout the population.

The method to be used in the construction of our prediction model basically resembles method 1, but is not identical

with either method. Our sample is small, almost immediately eliminating the use of method 2. However, the second method has several advantages which we have tried to incorporate into our method (a combination of methods 1 and 2), through the following adjustments.

First, rather than choosing factors merely because they discriminate (as in method 1), we chose specifically those variables which could all be united under one theoretical framework, and which also play central roles in several modern theories of delinquency. Not only does this allow us to test the accuracy of the several theories, but the importance and 'centralness' of the variables allows us to assume that all the individuals in the sample are characterized, to some degree, by every factor. Secondly, in order to take into account the possible interaction relationships between variables, we made two further modifications to method 1. We decided to

- a) test for the presence of the interaction between variables before constructing the final prediction model, and
- b) construct a multiplicative (rather than additive) model with the weighted variables.

After preliminary analysis of correlation and interaction, modifications will be made to the initially proposed prediction by

- a) changing the weighting system, and
- b) changing the combination of the variables (i.e. the number involved).

Criteria of Evaluation: Having noted the different methods of prediction, and the modified methods to be used in the present study, we now turn to an important discussion: how to evaluate the usefulness and effectiveness of a prediction instrument. Following are the five basic criteria which will be used to evaluate the device to be developed here.

1. What percentage (%) of the sample must be assigned to a 'residual' or non-predictable category? (Stuckert, 1958:233-235) Any category of subjects for which the model predicts no better than chance will be termed residual or non-predictable.
2. How efficient is the instrument? Two types of errors are possible; predicting delinquency for a subject who does not become delinquent, and predicting non-delinquency for a subject who later becomes delinquent. From the societal point of view, an ideal prediction instrument would spot, pick out or predict as future delinquents, all (100%) of the actual future delinquents. Of course, this is an unrealistic hope for a prediction device. Rather, we would hope that a very high percentage of future delinquents be predicted as becoming delinquent, and that the majority of non-delinquents also be predicted correctly. The distribution in the following illustration is an example of the results of the use of a very efficient prediction instrument.

ILLUSTRATION A

Prediction:	total cases	number of delinquents	number of non-delinquents
1)non-delinquent	92	2 (7%)	90 (75%)
2)residual	16	4 (13%)	12 (10%)
3)delinquent	42	24 (80%)	18 (15%)
	150	30	120

In our hypothetical example above, 80% of the known delinquents and 75% of the known non-delinquents were predicted correctly. In other words, the hypothetical prediction device is efficient because it 'spotted' or 'picked out' 80% of the future delinquents.

3. How accurate is the instrument? In any sample in which the total numbers of delinquents and non-delinquents are known, we can calculate any individual's probability, according to chance, of becoming delinquent or non-delinquent. Illustrating with our particular sample (delinquency defined as 'police contact three years later'), 30% of the subjects were delinquent; 70% were non-delinquent. Hence, using chance prediction, we would say that every individual's probability of becoming delinquent is 3/10 or .33; his chance of remaining non-delinquent is 7/10 or .67. Obviously, all the subjects in a sample do not really exhibit the same chances as each other subject, of becoming delinquent (or non-delinquent). The purpose of a prediction device, then, is to improve upon the accuracy of chance predictions for as many subjects or cases as possible.

In using a perfect instrument, the probability of those subjects predicted as delinquent, of actually becoming delinquents, would be 1/1 or 1.00. Their probability of becoming non-delinquent would be zero (.00). Likewise, the probability of those subjects predicted as non-delinquents, of actually remaining non-delinquent would be 1/1 or 1.00; their probability of becoming delinquents would be zero. This is, of course, a hypothetical situation, with a perfect instrument. In evaluating an actual prediction device, we would hope that, for those subjects predicted as delinquent, their probability of actually becoming delinquent would be as close to 1.00 as possible, and the same for those predicted to be non-delinquent, as in the following hypothetical distribution.

ILLUSTRATION B

Prediction:	Probability of delinquency for cases in this category	Probability of non-delinquency for cases in this category
1)non-delinquent	.20 = (1.00) =	.80
2)residual(chance)	.33 = (1.00) =	.67
3)delinquent	.80 = (1.00) =	.20

In order to test the accuracy of an actual prediction model, we must be able to calculate the probabilities of delinquency and non-delinquency associated with each predicted category. Hence we will define the probability of delinquency as the number of known delinquents in the sample who fall into that particular category, divided by the total number of cases or subjects falling into the same category. The probability of non-delinquency would

be simply defined as 1.00 minus the probability of delinquency (ex. $1.00 - .20 = .80$). The following hypothetical table illustrates results from the use of an accurate prediction instrument.

ILLUSTRATION C

Prediction:	total cases	number of del's.	prob. of del'cy.	number of non-dels.	prob. of non-del'cy.
1)non-del.	60	12	.20*	48	.80
2)residual	30	15	.50	15	.50
3)del.	25	20	.80*	5	.20
	115	47		68	

(* The probability of delinquency for subjects predicted as non-delinquent is only .20. The probability of delinquency for subjects predicted as delinquent is .80.)

Although the above prediction device only managed to single out 42% (12/47) of the future delinquents (efficiency), anyone using it can be reasonably sure that a subject falling into category three, i.e. predicted as delinquent, will become a delinquent. Although not all of the delinquents are 'spotted', the ones that are, are spotted accurately (few future non-delinquents fall into category 3).

Evaluative criteria two and three, efficiency and accuracy, should each be at an optimum level in a useful prediction instrument. In other words, a good prediction device would pick out most of the future delinquents (high efficiency) and would have a high probability of being correct in distinguishing delinquent from non-delinquent (high accuracy). Let us illustrate these criteria

with a few further examples. Suppose we start with a known sample of 100 cases, composed of 35 delinquents and 65 non-delinquents. An instrument with complete efficiency and accuracy would predict as in Illustration D. On the other hand, an instrument with low efficiency, but high accuracy might predict as in Illustration E. This instrument only picks out about half of the delinquents correctly, but the surety or probability of those in the delinquent category (predicted to be delinquent) of becoming delinquent is .77 or almost 8 times out of 10. In other words, although this instrument (Illustration E) only gets at half the future delinquents, future non-delinquents would fall into the 'delinquent' category only 2 times out of 10. In only 2 out of every 10 subjects predicted to be delinquent, will there be an error. An instrument with high efficiency, but low accuracy might predict the distribution found in Illustration F. This instrument correctly predicts 86% of the total future delinquents as delinquent. However, it also incorrectly predicts 46% of future non-delinquents as likely delinquents. Hence, although it picks out most of the future delinquents, it also includes a good many 'innocents' in the delinquent category. So, we say its efficiency is high but its accuracy is low. The use of an instrument such as this for choosing candidates for a delinquency prevention program obviously could have serious consequences.

ILLUSTRATION D

COMPLETE EFFICIENCY, COMPLETE ACCURACY

Prediction:	total cases	number of dels.	prob. of del'cy.	number of non-dels.	prob. of non-del'cy.
1)non-del.	<u>65</u>	0	.00	65(100%)	1.00
2)residual	0	0	.00	0	.00
3)del.	<u>35</u>	35(100%)	1.00	0	.00
	100	35 :	:	65	
		:	:		
		high----:	-----high		
		efficiency	accuracy		

ILLUSTRATION E

LOW EFFICIENCY, HIGH ACCURACY

Prediction:	total cases	number of dels.	prob. of del'cy.	number of non-dels.	prob. of non-del'cy.
1)non-del.	<u>78</u>	18(51%)	.23	60	.77
2)residual	-	-	-	-	-
3)del.	<u>22</u>	17(49%)	.77	5	.23
	100	35 :	:	65	
		:	:		
		low----:	-----high		
		efficiency	accuracy		

ILLUSTRATION F

HIGH EFFICIENCY, LOW ACCURACY

Prediction:	total cases	number of dels.	prob. of del'cy.	number of non-dels.	prob. of non-del'cy.
1)non-del.	<u>40</u>	5(14%)	.13	35(54%)	.87
2)residual	-	-	-	-	-
3)del.	<u>60</u>	30(86%)	.50	30(46%)	.50
	100	35 :	:	65	
		:	:		
		high----:	-----low		
		efficiency	accuracy		

The question of which criterion, efficiency or accuracy, is more important, is not a matter of concern here. It is a moral question -- a value judgment to be left to the discretion of those who may apply prediction devices in real-life situations. The onus is on those who develop prediction devices to provide as much information as possible with which the instrument can be evaluated by potential users. It is up to the potential users which criterion (or criteria) of evaluation they consider the most important.

4) Is the multi-variable instrument more useful or effective in predicting outcome than any one of the single variables of which it is composed? Obviously, if a single variable is more useful in predicting, the principle of simplicity demands that we discard the more complex device.

5) Finally, how useful is the instrument in predicting outcome for different degrees of delinquent behavior (i.e. serious delinquency -- mild delinquency)? It is an assumption that the obvious consequences of some forms of delinquent behavior are more serious than others ex. aggravated assault is probably more serious than breaking curfew regulations. Those predicted as future delinquents by a good prediction device should also include the most serious delinquents.

We have discussed in some detail, a)the methods of prediction, b)the ideal characteristics of a delinquency-prediction device, and c)the criteria of evaluation to be used in the development of the prediction instrument in the present study. Before developing our prediction device, we must outline the variables to be included in our model, the framework which ties them together, and the rationale for the choice of the variables.

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CHAPTER THREE

THE VARIABLES AND THEIR THEORETICAL FOUNDATIONS

The Logical Framework: The socio-cultural or sociological school of deviant behavior assumes that the properties of a social structure determine the behavior of the members of that system or, applied to deviance, that 'unfavorable' conditions of the social milieu encourage delinquent or criminal responses.

Originating from criminal statistics which blamed a multiplicity of social factors such as

"...the density of the population; public opinion; manners and religion; family circumstances; the system of education; industrial pursuits; alcoholism; economic and political conditions; public administration; justice and police; and in general, legislative, civil, and penal institutions",

(Enrico Ferri, quoted by Reckless
1967:386)

this school today is denying the utility of a simple multi-factor list, and concentrating on the development of theories which deal with the interrelationships between factors. In agreement with this trend, the present study involves factors chosen for the following reasons:

- a) they each play an important role in several accepted 'univariate' theories of delinquency
- b) together, they present a fairly comprehensive, socio-psychological picture of the individual human being, and
- c) there is a logical framework which effectively 'ties them together', namely symbolic interactionism. (Rose, 1962; Manis and Meltzer, 1967; Blumer, 1969)

Symbolic interaction is not a theory in any strict sense, but a general orientation to human phenomena. It affects the researcher who uses it in subtle but pervasive ways, determining not only the phenomena chosen for study, but also the concepts used to analyze them. A simplified version of Mead's (1934) ideas of interaction between the self and the social environment is as follows. A child is born into a world of significant symbols and symbolic interaction. The learning of the use of significant symbols leads to the taking of roles. Role-taking is simply the sharing of the perspectives of others. Self then becomes symbolic action towards oneself in terms of the significant other and/or the generalized other. Self is an internal conversation between the impulsive 'I' and the incorporated perspectives of others, 'me'. Symbolic interaction is both a medium for human development and a process for human association. Hence, it provides an appropriate framework for the discussion of human behavior in general, and deviant behavior in particular.

The five variables chosen for the prediction model can be related to each other through this framework as follows. Family cohesion (FC) and the perceived expectations of others (PEO-parents and PEO-peers) can be grouped under "the influence of significant others". Perceived opportunity (PO), the perceived expectations of others (PEO-teachers), and teacher rating (TR) can

all be grouped under the heading, the "influence of the generalized other". Self esteem (SE), of course, falls under the "influence of the self concept in role-taking".

The framework of symbolic interaction shows us how the variables can be related to one another. The next section presents

- a) rationalizations for the choice of the variables because of their place in the modern literature,
- b) conceptual clarification of the variables in this particular study, and
- c) the operational definitions of the variables.

We look at each variable in turn.

Delinquency Involvement (DEL): This concept, our dependent variable, refers simply to behavior which is in violation of a legal or normative code, whether the individual is apprehended or not. This study is concerned with the delinquency involvement of the sample, measured at two different time periods. The earlier measurement is used in the data analysis in the development of the prediction device. The later measurement, taken three years subsequent to the first, is used to test the predictive accuracy and efficiency of the constructed instrument, i.e. we attempt to predict this later delinquency involvement.

The operational definitions of this variable (time one measurement) are as follows. The first measure (D1) was a conventional self-report instrument. Using seven items from the Nye-Short scale (1957) plus two additional items

(see appendix, page 162),the subjects were asked "Have you done these things? If so, how often? (For a discussion of the self-report method, see Hardt and Bodine,1965.) The second and third measures were modelled on Sutherland's theory of differential association, and supported empirically by the work of Jackson and Marcia Toby (1961) in which they considered a subject delinquent if his friends had a record of delinquency. The inaccuracy of police records and the fact that much delinquency is companionate behavior, suggested to them that a boy with delinquent friends, but no official record, was probably a delinquent who had not been caught. Consequently, we asked the boys, "How many young people (under twenty-one) do you know who have been in trouble with the police for other than a traffic violation?" "How many young people (under twenty-one) do you know who have ever been taken to Juvenile Court?" Those who knew many others who were in trouble were classified as delinquent for our second and third measures of delinquency (D2 and D3). The fourth operational definition of DEL, counsellor referrals, was the number of times the subject had been referred to the school counsellor as a disciplinary problem that year (D4). For the final measure, the subjects' names were checked against police record files to ascertain whether or not they had had any contact with the police up to the time of the study (D5).

The later measurement of DEL was a summary score of the number of police contacts (D6) in the three years (1965,

1966, and 1967) following the initial or earlier measurements of DEL. A study attempting to use an earlier measure of delinquency in the development of models to predict later delinquency, should ideally contain time two measures corresponding to all of the first operational definitions of delinquency. However, the confines of the data limited us to only official police contact records for our time two measurement.

The weaknesses in official records such as police contact are quite obvious. Depending on the tolerance and leniency of the law officers in a particular district, a subject may be released after a reprimand or sent to Juvenile Court for the same behavior. Also, the fact that a juvenile is caught may merely reflect his 'amateurism' in the game of cops and robbers, rather than the amount and seriousness of his delinquency involvement. One could speculate that the more times one is involved in delinquency, the higher will be the probability of getting caught. On the other hand, experience may help to prevent detection. A final weakness of our time two measurement, police records, lies in the possibility that those with no recorded police contact three years after the initial measurement, may have moved away and have unobtainable police records elsewhere.

Family Cohesion (FC): Studies linking family conditions to delinquency, according to Martin and Fitzpatrick (1967), can be classified under two main categories.

- a) those which explain delinquency in terms of structural problems such as broken homes or working mothers etc.,
- b) those which explain delinquency in terms of functional problems, referring to such things as faulty socialization methods, inadequate role models etc..

These two types of studies are rather arbitrary, as the contingencies covered by each are closely related to, and overlap, each other. However, two different areas of research branched from the above two categories.

Initially, the first category of study resulted in a multitude of causal correlations, many contradicting each other, but more recently the results are void of causal statements about structural conditions, referring to them as contingencies or possible 'triggering' devices of delinquency. The first category has yielded largely descriptive studies analogous to theories which maintain that poverty, poor housing, or other structural deprivations are causes of delinquency.

The second category has been by far the more influential. With its roots in Freudian psychology, this area of study links criminality to internal family conditions, connecting early childhood experiences with later delinquency with a causal bond. Aichhorn (1936), probably the father of this approach, maintained that faulty development in the early years prevents a child from developing an effective ego-superego management system, resulting in behavior governed by uncontrolled impulses. (See also Friedlander, 1947 and Redl, 1951.) Unfortunately, this approach fails to specify which of the resulting "impulsive"

individuals come into contact with the law, and why, and with what results. Also, faulty socialization is discussed entirely in the context of successful (or unsuccessful) achievement of the neo-Freudian stages of growth, neglecting entirely such things as principles of learning, and role acquisition and role committment.

Treated as a single variable, i.e. 'good' or 'bad', the family has not been a satisfactory explanation for delinquency. However, we still could not entirely ignore the influence of the family situation on behavior because, in combination with other factors, it might prove to be a very useful predictive tool.

Our particular measure of the family influence on delinquent behavior was a measure of the individual's own perception and feelings about the general favorable-ness of his family atmosphere. In contrast to the above types i.e. direct, specific measures of the structural conditions of the family or the bad habits of the parents, this measure was an attempt to uncover what was believed by the author to be a more diffuse influence. The subject was asked such questions as "Are your parents interested in what you do? In general, do you feel that you get a 'square deal' with your parents? Do you think your parents try to understand your problems and worries?" The family cohesion scale (see appendix, page 163 , for the complete set of questions) was a measure of how significant others in the family might affect an individual's behavior through his perceptions of the general home situation.

Perceived Expectations of Others (PEO-peers, PEO-parents, PEO-teachers): One of the main themes of Mead's work (1934) on symbolic interaction is the influence of the responses of 'others' on the formation of an individual's behavior, both non-deviant and deviant. The influence can be in one of two forms:

- a) the actual expectations of others, or
- b) the expectations of others as perceived by the subject (and as measured by our variables, PEO-peers, parents, and teachers.)

The first form probably has a more indirect influence on an individual's behavior, by influencing the 'other's' behavior toward the individual. One study (Reeder et al, 1960) presents findings which demonstrate that the second form of influence is the more important, and Miyamoto and Dornbusch (1956) agree that

Although it is Mead's habit to speak of the "response of the other" as providing the key to the definition of the self, the phrase is somewhat ambiguous, for a distinction may be drawn between a) the actual response of the other and b) the subject's perception of the response of the other. Mead often does not distinguish between the two; but it is consistent with his view that the perception of the other's response is the critical aspect.

In support of the importance of 'others', Empey (1967:32) has noted that most studies place the incidence of group delinquency between 60 and 90 percent of the total, with a modal figure of about 75 percent. Few studies question seriously the proposition that a high percentage of delinquent behavior takes place in a social setting

i.e. in the presence of other people, or in the presence of others' felt influence (even though the other may not be bodily present). Using the three PEO variables, we hoped to measure the influence of several of the subjects' significant others. A delimited, specific concept concentrating on differentially influential individuals in one's immediate social milieu, the significant other includes those with whom one has or had face-to-face interaction such as friends, parents, or teachers, or others with whom contact has been frequent and relatively intimate. Kuhn (1967:181) has changed significant other to 'orientational other', and further clarified the term with four defining attributes.

1. The term refers to the others to whom the individual is most fully, broadly, and basically committed emotionally and psychologically.
2. It refers to the others who have provided him with his general vocabulary, including his most basic and crucial concepts and categories.
3. It refers to the others who have provided and continue to provide him with his categories of 'self' and 'other', and with the meaningful roles to which such assignments refer.
4. It refers to the others in communication with whom his self-conception is basically sustained or changed.

The best-known, and earliest systematic sociological theory of the influence of others on delinquent behavior was Sutherland's differential association theory (1955: 74-81). Based primarily on the idea that behavior must be learned, Sutherland's theory related delinquency involvement to an individual's differential access to

delinquent and/or conventional 'definitions' through his interaction with various types of people. This theory maximized the common learning process of deviant and conformer, differentiating them merely 'by the company they keep'. (For criticisms of Sutherland, see Clinard, 1957; Korn and McCorkle, 1959; Briar and Piliavin, 1965; and Reckless, 1967.) Attempts to improve on Sutherland led to greater specification and delineation of the various significant others. In looking at the perceived expectations of others, we deal with three distinct 'others': peers, parents, and teachers.

As mentioned earlier, several studies confirm the fact that a high percentage of delinquency takes place with accomplices or companions. "Except for the occasional delinquent act committed by the lone offender, rare and symptomatic of a deeply disturbed youngster, most juvenile delinquency is committed by groups or gangs rather than individuals." (Bloch and Neiderhoff, 1958:14) It is only natural to seek causation in a so strongly correlated contingency. The whole notion of the influence of peers stems from the idea that adolescents are at the age at which they tend to choose peers as reference groups, and will tend to do anything which they perceive will impress their friends. Muzafer and Carolyn Sherif (1964) have stated that delinquency is not deviant behavior, but is in conformity with peer-group norms.

Since the revival of Thrasher's classic work, The Gang, (1927) much emphasis has been placed on the formation

and influence of gangs and subcultures of delinquents. (See also Cohen,1955; Yablonsky,1962; and Wolfgang and Ferracuti,1967.) However, in contrast with Thrasher who saw the gang as an entity with little continuity, ("Most gangs are in a condition of unstable equilibrium. Those which endure over a period of years are relatively rare in comparison with the great number of rudimentary forms." 1927:37) later ideas (Cohen,1955; Yablonsky,1962; Miller, 1958) have represented the gang as a structure with collective behavior, common goals, common values, and common traditions. Naturally, an entity organized in this more stable manner could serve as a more influential reference-group for its members than a spontaneous structure. But the question still remains: why do some youths not accept the 'socialization' offered by their peers? Peer influence cannot totally explain the onset of delinquent behavior. Eynon and Reckless (1961), in a study of the companionship factor, found that companionship is a major component of male delinquency, independent of the age of onset of the behavior or the extent of poor socialization, suggesting that peer influence is not a causal factor in the genetic sense (i.e. stemming from the actor's early history) but is rather a situational contingency. As Reckless puts it, "it is more accurate to say that twosomes or threesomes, who may be members of a gang, become involved together in a delinquent act. It is not easy to demonstrate that they are following models

which they took over directly from their gang or peer group." (1967:424) Short and Strodtbeck (1965, chapters 11 and 12) have noted that delinquent subcultures promote delinquent actions not due to the strength of their prescribed behavior, but because youths find themselves in situations where there is a high risk that someone else will commit a delinquent act. The dynamics of the collective behavior in the immediate situation (the peer influence) may overwhelm other factors. (For example, a boy's status may be threatened if he declines participation.) It seems then, that the expectations of peers play an important role in influencing behavior, but as a situational contingency or intervening variable, rather than a genetic causal factor of delinquency.

The second significant other we deal with is parents. The place of the parental influence in the literature was discussed under Family Cohesion. In contrast to FC, a general, diffuse measure, we proposed PEO-parents as a more direct, specific definition of the influence of parents' actual expectations. Probably the earliest attempt at discussing the interaction between parental and peer factors was made by Shaw and McKay (1931) in their assertion that delinquent behavior occurs when an individual, who is predisposed to deviance by a particular family background, has the opportunity to learn such behavior from a peer group in a neighborhood that is traditionally tolerant towards delinquency. In a more recent paper,

Weinberg asserted that "...criminal behavior, as manifested among juveniles, arises when, for individualized purposes or emotional security, self enhancement, or conflict resolution, they seek and select accessible associates from whom they learn, accept, and express criminal attitudes." (1954:421) However, in looking at the relationship between parental and peer variables, Stanfield (1966) cautions us to remember that parental influence does not necessarily lead to conformity to the law, and peer influence to conflict with the law (as asserted by Haskell, 1960). Unhappy family relations during adolescence, and consequent increase in peer influence will only lead to delinquency if the cultural conditions are favorable to violation of the law. On the other hand, a "good" peer influence may overcome delinquency predispositions brought on by a "poor" family situation. It would be unrealistic to consider parental and peer expectations as independent influences, since there can be so many different types of peer-parent orientations in adolescence (Bowerman, 1959). In reality, adolescence is a period of competitive interaction between the family and the peer group for the loyalty of the individual. Hopefully, the use of the variables, PEO-peers and PEO-parents, will further clarify and delineate this apparent interaction.

The successful use of teachers as predictors of future problems with students by both Lively(1962) and Khelif(1964) suggested that the influence of the teacher's expectations

on the individual could not be overlooked here.

Unilateral influence, i.e. where the influence is primarily one-way, is most likely to occur under the following conditions:

1. There is an inherent attractiveness, in the existing situation, about the behavior toward which the influencer points.
2. The degree and nature of one's attraction to the potential influencer is strong.
3. The requirements of one's existing role relationships with the potential influencer dictate such unilateral influence.

(Newcomb,1965:281)

The decision to include the variable, PEO-teachers, was based on reasons two and three above. First, an individual may consider his teacher as an intimate friend, a significant other. The expectations of a teacher who is accepted in a fairly primary relationship may have a great impact on an individual's behavior. Harvey and his colleagues (1957) noted that the evaluations of acquaintances had more impact than those of strangers, but if the acquaintance was disliked the subject tended to devalue the worth of his opinion. The fact that many students dislike their teachers questions our first reason for including their expectations. Also, one empirical study (Hackler,1966) provides some evidence that the influence of teachers is inconsequential. However, if the individual has only one valid source of information concerning certain topics (in this case, academic ability, chances for future job success etc.) then he cannot discount the expectations of that source, even if it is disliked. This applies particularly to

lower-class children who have very limited sources of information in these topics. It appears that the teacher can be considered an influence either because of an 'affectional' bond or an 'informational' bond, or a combination of the two.

It is generally assumed, (correctly or incorrectly), that the peer influence during adolescence will be greater than that of either parents or teachers, and as is specified later, the initial prediction model weights peer influence heavier than the other two. However, since all three influences seem to play some part in behavior, it seems logical that what claims to be a systematic unified approach to the study of deviance should necessarily include early personality development (i.e. parental influence), peer influence, and the influence of less closely related community figures (teacher influence). It is one of the purposes of this study to show which of the above influences is the strongest, or if the interaction among them accords them differentially weighted roles in determining behavior.

The three variables, PEO-peers, PEO-parents, and PEO-teachers, were operationally defined as follows. Using the same modified Nye-Short scale as was used for the self-reported deviance measure, (see appendix, page 162) the subjects were asked "Would your friends expect you to do any of these things? If so, how often?" (PEO1) "How about your parents; would they expect you to do any of these things?" (PEO2) "What about your

teachers; would they expect you to do any of these things?" (PEO3) Since we have measures of perceived expectations of others, it would have been desirable to have obtained actual expectations, but it was not possible to measure these as well.

Perceived Opportunity (PO): Rather than dealing with specific individuals, opportunity theories deal with the individual's perception of the conditions of his overall social structure and milieu. Opportunity theories look for the basic causes of delinquency in the dysfunctional aspects of the greater societal structure. Based on the premise that in western society, goals are common to all, but institutionalized (or legal) means to achieve them are not, these theories attempt to explain the possible consequences when an individual is faced with unachievable goals.

Merton, borrowing from Durkheim's original discussion of anomie, put forth this means-end theory of deviance (Merton, 1938 and 1957: chapters 4 and 5). The 'innovator', in Merton's terminology, is one who accepts the general goals of society, but must attain them through illegitimate means because he perceives that the immediate social structure denies him access to society's goals through legitimate means. (For a critical examination of Merton's structural analysis of deviantion, and his neglect of such factors as groups, technology, psychic processes, and socio-biological handicaps, see Lemert,

1967:chapter 1.) Along these same lines, Cohen (1955) maintained that lower class youth feel that they are constantly judged by the standards of the middle class (middle-class measuring rod), and realizing with frustration that they can never achieve these expected standards, the lower class undergo 'reaction-formation in which they invert the values of the middle-class and by a process of 'mutual conversion' (group support), form a subculture expounding values which they can support. In other words, lower class youth, perceiving failure in one opportunity structure (middle-class society), form opportunities of their own. However, Cohen assumed a sharp distinction between middle and lower class value systems, an assumption not totally supported by empirical studies. He also failed to explain why cultural inversion is a result of the frustration rather than some other reaction, such as withdrawal. (See Martin and Fitzpatrick, 1967:63-69.) The most recent addition to opportunity theory by Cloward and Ohlin (1960) suggested that even individuals with 'lower-class' goal orientations may not succeed. Faced with both legitimate and illegitimate opportunity structures, individuals will adapt in different ways to success or failure in either structure.

Although the explanation of deviant behavior in terms of differential opportunity and unfulfilled aspirations may be an improvement over 'inadequate socialization' or 'conformity to delinquent role models', opportunity

theory alone still cannot explain who becomes delinquent, who remains aloof, or why available legitimate structures in lower-class environments are utilized by some and not by others.

However, we cannot ignore the possibility that perceived structural opportunities, interacting with other factors, might influence an individual's behavior. Schrag has noted that

"perceived disadvantages regardless of the accuracy of the perception, is for lower-class youth the functional equivalent of objectively verified disadvantage in that it has the same effect on overt behavior."

(Schrag, 1962:168)

Landis and colleagues (1963), in an empirical test which provided modest support for opportunity theory, concluded that the objective nature of the opportunity structure was less important than attitudes and ideas about it, and the perception of it by the individual. A later study (Short, Riviera, and Tennyson, 1965) also operationalized opportunities in terms of the subjects' perceptions. One author (Liu, 1963) has even suggested that perception of limited opportunity may be the effect of delinquent status rather than a causal variable leading to delinquent behavior. In other words, we might expect that every delinquent (officially labelled) may think that there is very little one can do once the status of 'delinquent' is permanent. Whether we consider perceived opportunity to be antecedent, intervening or consequent to delinquent behavior, we must consider it in a prediction model

Elliott, in 1962, found that delinquents perceived lower opportunity than non-delinquents to enter 'successful' educational and occupational positions. Basing our operational definitions on this study, we measured the subjects' perceptions of a) school opportunities b) job opportunities, and c) general opportunities, with the following questions.

a) How far do you think you will really get in school? (PO1)

- | | |
|-----------------------|-------------------------------------|
| 1. 8th grade | 4. Junior College or Technical |
| 2. Junior High school | School |
| 3. Senior High school | 5. Finish 2 years of College |
| | 6. Finish College (4 years or more) |

b) Here is a picture of a ladder. The top of the ladder (9) is the very best job you can imagine. The bottom is the worst job (1).

--9--
 --8--
 --7--
 --6--
 --5--
 --4--
 --3--
 --2--
 --1--

What type of work are you sure
 you can get? Where on the ladder
 would you put it? (PO2)

Step number _____

c) Here is another ladder. Suppose that the top of the ladder (9) stands for the best possible life that you can imagine for yourself and the bottom (1) stands for the worst possible life you can imagine for yourself.

--9--
 --8--
 --7--
 --6--
 --5--
 --4--
 --3--
 --2--
 --1--

Where on the ladder do you feel
 you will stand when you are an
 adult? (PO3)

Step number _____

Self-esteem (SE): Sociological theories which place great importance on the relations between deviant behavior and self-role conceptualizations trace their origins to the foundations laid by Georg H. Mead (1934). Systems of social behavior are transmitted from generation to generation through learning, and to facilitate the regulation of behavior, it is transmitted in categories or patterns, called roles. The individual learns roles, recognized categories of his social system, which are compatible with his perception of his self. Therefore, role is a linking concept, connecting the personality system of the individual with the social organization of his milieu. Validation of the self which we claim to be, is achieved through 'others' validation of the roles we (dis)play to them.

"Everybody is continually engaged in the life-long process of building, maintaining, or re-fashioning a self. Working with the role repertoire provided by his culture, he plays at being this sort of person or that, observes his success or failure as he reads it in the responses of others, discovers whether it is hard or easy for him to carry it off, and whether it is really worth it."

(Cohen, 1966:98)

Some writers see the importance of Mead's concept of self only in the idea that the self-as-object is produced by the conceptions of other people. But the main reason that Mead's self is so useful in sociological theory is that it allows us to deal with the individual in terms of interaction. The development of the self-concept (i.e. the ability to see oneself as an object) is a

process of interaction between the individual("I") and the perspective of the other ("me"), not a one-way line of influence. This single fact may be the reason why purely sociological prediction is never entirely accurate.

Delinquency may be viewed as an attempt to validate or lay claim to a certain kind of developing self. This view assumes that the self is an antecedent variable and that behavior is motivated and goal directed. (This concept of delinquency is akin to Lemert's 'secondary deviance', which is a socially defined response to societal reaction to 'primary', accidental, non-goal-directed deviance. Lemert,1967) According to extensive work done by Reckless and his associates (Reckless,1956,1957,and 1967; Dinitz,1958), self-concept can be an insulator against involvement in delinquency. Their analysis (1956) has revealed that a well-developed concept of self as a 'good' boy, in conjunction with this self-concept being in conformity with the expectations of others, will be validated through non-delinquent roles even in 'delinquency-prone' neighborhoods. In a comparative study of delinquents and non-delinquents, Reckless (1957) reasoned that if a socially acceptable or appropriate self-concept would insulate a boy, then an adverse concept of self might encourage the tendency towards delinquent roles. The results supported this assumption, indicating that potentially 'insulated' boys seemed to define themselves and seemed to be thought of

as 'good' boys by their parents and teachers; potentially delinquent boys seemed to define themselves and to be defined in an opposite manner (Reckless,1957:569). The potentially delinquent nominees were more negative in their appraisals of self and in the perceptions of their relationships with others (Dinitz et al,1958:230).

However, Reckless' work must be approached with caution. An excellent critique by Tangri and Schwartz (1967) points out that, besides several methodological problems, these studies incorrectly imply that a delinquent self-concept is the same as a negative self-concept. The operational definitions of self-concept in the Reckless studies only measure questions of fact.

"...insofar as the boy states facts as he perceives them about his present behavior, the age and delinquency of his companions, 'activity level' (whatever that is), whether he relies more on his friends or his parents for advice, etc., he tells us nothing about whether he thinks these are good or bad things i.e., how these reflect on him personally and in his own judgment. Even in his judgment about the likelihood of his getting into trouble in the future, we do not know whether 1) this is self-criticism, 2) a badge of bravado, or 3) whether the prediction is accurate."

(Tangri and Schwartz,1967:188)

Since the 'bad' boys (those who had already been in trouble at the time of the study) defined themselves more often as future candidates for trouble than the 'good' boys (Reckless,1957:232), it might be reasonable to assume that these results are accurate factual predictions by the boys based on past histories. But we should be more

concerned with their evaluations i.e. it is quite possible that 'bad' boys have a positive self-concept (high self-esteem), and pride in their record and their toughness. A delinquent self-concept can only be consequent to delinquent behavior, but a negative self-concept (low self-esteem) may be antecedent to such behavior. Delinquency may be an alternative choice for an individual who has failed to develop a positive self-concept through other channels of behavior.

Apart from the weaknesses found in Reckless' work, a great deal of conflict also exists in the empirical results of other research attempting to link self-concept and delinquency. Kinch (1962) found that different types of delinquent offense patterns (prosocial, antisocial, and asocial) could be linked to self-concept. Similarly, a study by Fannin and Clinard (1965) showed differences in self-conception to be related to types of delinquent behavior, and suggested that rehabilitation be focused on the social self. Although dealing with girls, two unpublished dissertations by Grant (1962) and Purcell (1961) also support the thesis that delinquents exhibit a tendency towards attitudes of self-depreciation and lack of self-esteem, yet did not support any relationship between type of delinquent behavior and self-concept ratings. Liu, in a 1962 study, found significant differences between delinquents and non-delinquents, with delinquents exhibiting the larger number of unfavorable self-concepts. In a

later discussion (1963:10), he suggested that delinquency may be a function of the relationship between self-esteem and the ability to control one's environment. Persons with low self-esteem (possibly due to past failures in legitimate behavior) must resort to delinquency as an alternate means of gaining control of their environment, so that it reflects a positive picture of themselves.

On the opposing side of the conflict about the self-concept are those who, for several different reasons, argue that a measure of self-evaluation should not improve delinquency prediction. Barbara Lorch (1966) has suggested that cognitive congruity is more important than having high self-esteem.

"...perceiving oneself as others do, even if that perception is negative to one's self-esteem (such as seeing one's behavior as wrong), produces a situation for the individual which has less damaging consequences for him than does a difference in perception of the individual's behavior by self and significant others."

(Barbara Lorch, 1966:227)

In the same year, Peter Hall (1966) hypothesized that a direct relationship exists between delinquency involvement and self-concept, with those totally committed to delinquency exhibiting high levels of self-evaluation (high self-esteem). Hence, he proposed that identification with or orientation to, a delinquent subculture would be a better predictor of delinquency than level of self-evaluation. Earlier, Short and Strodtbeck (1965) found that self-descriptions elicited from gang boys were not associated with clear-cut delinquency differences. They

see "...the interplay of group expectations and situational requirements (as overdetermining) delinquency to such a degree that, when the contribution of self-description to the prediction of behavior is added, no improvement results." (1965:39) Finally, in an article in which he discussed several types of delinquency prediction devices, Rose (1967:16) concluded about the use of self-concept:

"The picture of the adolescent with low self-esteem which emerges is one of a rather withdrawn and an anxious personality, and not what one would associate with delinquency."

The apparent contradictions existing in this area of research are probably a result of two basic factors.

1) The theoretical conceptualization: The disagreement about the definition of 'self' which started with the introduction of the concept in 1890, has carried over with no improvements or clarifications, to sociology. There still appears to be much confusion over such terms as self, self-concept, self-esteem, self-descriptions, self-evaluation, real self, ideal self etc.. These terms usually have very subtle distinctions in meaning.

2) The operational definition of the concept: Since self-concept is internal to the organism, it must be intuited or inferred by the researcher. So many instruments have been used to measure self-concept that it is impossible to categorize them or assess their value in this context. (For an excellent review of empirical studies of the self-concept, see Ruth Wylie, 1961.) It is enough to point out

that the measurement problem is a seedbed for the growth of all types of contradictions.

In order to avoid some of the confusion in the literature, we used self-esteem to refer specifically to the subject's own evaluation of his performance in life. By using the evaluative counterpart of self-concept, we avoided the confusion experienced by Reckless between delinquent self-concept and negative self-concept. As mentioned above, recent research has linked both positive and negative self-concepts to delinquency involvement. Perhaps one way to resolve this conflict would be to scrutinize the interactive relationships involved, i.e. to be particularly sensitive to the impact of other variables on the relationship between self-concept and delinquency. For instance, it is quite possible that successful involvement in delinquency could lead to higher self-esteem, especially for boys, but this is quite different from claiming that boys with positive self-concepts, will become delinquent. Since our data was gathered over a time period, from the same sample, we may be in a good position to resolve some of the conflicting issues. The inclusion of the 'self' variable in the prediction model was for several purposes.

1. Resolving conflicts
2. Providing a more complete picture of the influences impinging on the individual, and finally
3. Providing a possible missing link in a complex chain of theory which has attempted to explain delinquency. (The variable, self-esteem, may help to explain "who" will respond to delinquency-prone situations and "who" will not.)

For our purposes, self-esteem was operationally defined as follows.

- a) The first measure was a single direct question. "Some people are just about perfect--just about the way you want them to be. Others are just about the opposite--not the way you want them to be at all. What about yourself? For a boy your age, are you just about the way you want to be?" (SE1)

Just about the way I want to be	1	2	3	4	5	6	7	Just about the opposite of the way I want to be
---------------------------------------	---	---	---	---	---	---	---	---

- b) The second measure was a summary score, an average of the subject's perceptions of how three important 'others' felt about him. "Some people may think that you are just about perfect--just the way they would want you to be. Others may think you are just about the opposite--not the way they want you to be at all. Think now of your mother (your teachers, your best friends). For a boy your age, are you just about the way your mother (teachers, best friends) would want you to be?" (SE2)

Just about the way they would want me to be	1	2	3	4	5	6	7	Just about the opposite of the way they would want me to be
---	---	---	---	---	---	---	---	--

This measure of self-esteem is somewhat like the variable, perceived expectations of others. However, the three PEO variables measure what behavior one thinks others expect; self-esteem (SE2) measures what evaluations of worth one thinks others have concerning him.

- c) The third measure might be called a discrepancy score. Each subject was given a list of adjectives (see appendix, page 165) and asked "How about you? How do you see yourself?" and "How important is it for a boy like you to be X (ex. reliable)?" (SE3) The boys were rated as follows.

The individual sees himself as X, and considers it important to be X. = High self-esteem

The individual sees himself as
not X, but considers it important = Low self-esteem
 to be X.

In using the concept, self-esteem, we were aware that differences between delinquents and non-delinquents might possibly reflect the negative side effects of official action rather than antecedent differences, since stigmatization by official agencies probably has most effect on self-attitudes, matters relating to emotional adjustment, ego-identity, and role behavior. However, we assumed that by the age of delinquency involvement (probably 11 to 13 at the earliest) most children have developed enough of a cognition of 'self' for it to play an influential role in behavior. Also, the fact that official action may have had some impact on self-esteem (probably quite limited because of the young ages of the subjects) does not alter the theoretical value of the concept, even though it may weaken its predictive capacity.

Teacher Rating (TR): The choice of this variable was motivated by the theories of deviance which spotlight the role of those who react to, judge, and label behavior as deviant.

"Sometimes I ain't so sho who's got ere a right to say when a man is crazy and when he ain't. Sometimes I think it ain't none of us pure sane until the balance of us talks him that-a-way. It's like it ain't so much what a fellow does, but it's the way the majority of folks is looking at him when he does it."

William Faulkner, As I Lay Dying
 (quoted in Becker, 1963)

In these theories, the characteristics of the individuals or situations involved, give way to the central importance of the disapproving, degredational, 'social control' reactions of society (Lemert,1967). According to Becker, "the deviant is one to whom the label has been successfully applied. Deviant behavior is behavior that people so label." (1963:9) (This line of thought also agrees with Tannenbaum,1951; Lemert,1951; and Kitsuse,1962.)

The reactions of society are implemented through two channels: the legal system and the system of non-institutionalized folkways and mores. As far as the application of legal rules is concerned, Lemert has put it succinctly:

"Being labelled delinquent "...depends upon the perception of arresting officers, availability of biographical data, estimates of the morality of (one's) parents, monetary claims of victims, the biases in judges, and the therapeutic ideologies of probation officers and social workers."

(Lemert,1967:25)

All the same ideas apply within the system of informal judgment as well. Rules differ from community to community and application of the rules depends on those who 'judge' as well as the characteristics of the 'judged'. The main point stressed here is that delinquency has no substantive meaning apart from (or independent of) the judgment process involved in social control.

Ideal data would have included some measure of the judgment of an individual by both a) legal officials, and b) informal social control representatives. However, the

only measure obtainable was a measure of an evaluation or 'label' of our subjects by an informal control agent, a teacher. Assuming that the above ideas on societal reaction were true, we hypothesized that, if an individual's teacher labels him as likely to get into trouble in the future, such an evaluation or 'label' could have an influence on the individual's behavior. This variable was operationally defined by asking the subjects' home-room teachers the following question.

"What would you guess this student's chances are of getting into trouble in the future?" (TR)

very										very
likely	1	2	3	4	5	6	7			unlikely

We have now discussed each of our variables separately. The next chapter will show how they can be joined together to form a multi-variable prediction model.

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CHAPTER FOUR

THE MODEL

Definition of the Problem: Social scientists have come a long way in delineating individual factors influential in the development of delinquent behavior. Delinquency has been shown to be a result of dispositions, plus a triggering device: personal-social qualities of the individual interacting with the particular qualities of the situation. But to make accurate predictions, (and since we cannot possibly anticipate all situations) we must be particularly concerned with the development of the 'predispositions'.

Let us consider two hypothetical routes to delinquency, and we shall see that the interaction of factors will be different. Up until the child enters school, neither his physical nor social development allows him to expand much beyond the home and the influence of a few significant others (family and one or two friends), or to engage in behavioral experimentation which is likely to be delinquent. Within this narrow context, he may have developed an evaluation of self, but it is based on such a restricted frame of reference, that its influence on subsequent behavior (delinquent or non-delinquent) may not be lasting, and his self-concept may change drastically within the new setting provided by graduation from home base to school. At this point, the child probably gains increased physical mobility, is given more chance to explore the world

outside his home and meet more people who will also become included in his list of 'mirrors'. This is the period of transition from family membership to family-peer orientation. Peer orientation becomes very high regardless of, or in spite of, family ties. The individual also meets more general authority figures and learns that the judgment process has a much broader societal base than just his family group. It now includes teachers, counsellors, police, health officers etc..

If until this time the family has provided the individual with positive 'mirrors', his identification with the family will probably remain relatively strong, and his parents' basic norms and values will compete successfully with those of his new-found peers. If however, he has received constant negative feedback from his family associations, the individual will attribute greater significance to those who may prove more rewarding to his developing self-concept. If he happens to live in a cultural context in which delinquent behavior is reinforced by peers, he most probably will become delinquent through the following possible routes.

What Lemert (1967) calls primary deviance, an accidental, non-purposeful delinquent act, is suddenly reinforced by peers. Parents and teachers either do not react at all, or react negatively to this behavior, confirming the individual's suspicion that they were never good 'mirrors' anyway. Rather than a poor self-concept producing behavior more in

conformity with parents and teachers, it probably leads to an eventual rejection of the negative judges, and an adoption of new 'mirrors' (peers), more positive ones. A period of 'drift' (see Matza, 1964) probably occurs here, in which a mixture of goal-directed and non-goal-directed delinquency occurs. Increased reinforcement of delinquent acts, leading to increased frequency, leading to an increased possibility of getting caught, eventually develops, in the individual, a delinquent self-concept. (Note: not a negative self-concept.) Formal apprehension and/or sentencing produces more behavior consistent with the stigmatized role and that behavior is responded to by others as validation of the individual's claim, solidifying more strongly the new role. This picture of the development of a delinquent role is one of drift, risk, or contingency not one of true linear progress as in Becker's concept of career (Becker, 1963:chapter 2). If the legitimate society (parents, teachers, police officers etc.) has given up the individual as incorrigible, and he has denied their importance, and still he is succeeding (has positive feedback from peers) with other 'mirrors', then his self-esteem should be high. He receives consistent feedback from his significant others as well as consistent expectation from those whom he no longer considers significant anyway.

If, however, we go back in the developmental process to the beginning and find that our first possibility is true,

i.e. the individual has received positive feedback from family associations, and so identifies strongly with family values and norms, we find a second, different route of the development of delinquent behavior.

Firstly, if the cultural context allows him ample opportunity to associate with peers who uphold his family's norms and values, then any delinquent acts committed must be considered as non-goal-directed, accidental, fun etc., and with all probability will not develop into 'secondary' deviance (Lemert,1967). On the other hand, if family identification is strong, and the individual feels his family is important, but the only available peer associations are in an opportunity structure which promoted delinquency, conflict will occur. He will be positively reinforced for opposite behaviors. Expectations for him will be inconsistent, and his self-concept will not develop along a clear, non-conflictful route. He may attempt, through rationalization (Sykes and Matza,1957) to explain his delinquency in terms which will allow him to still receive positive feedback from parents and teachers, as well as from peers. However, recognition of the conflict occurs when the boy's network of rationalizations collapses in the face of repeated contradictions from his cumulative experience. This is the person whose self-esteem may be low, whose self-concept is inconsistently mirrored by significant others, all of whom he values.

The purpose of the above discussion was to make it clear

that the development of delinquency involvement may be along several different orderly sequences, and depending on what went before, a 'cause' at one point may be of negligible importance at another.

The Formula: Many factors operate to produce delinquency involvement, but all do not operate simultaneously (Becker, 1963:22-25). How can we measure the complex interaction patterns which must exist between self-concept and social-structural variables, and how do they all relate to delinquency? As Tangri and Schwartz (1967:190) so aptly stated,

"(unless) a design is formed which includes not only self variables, but also structural and cognitive (such as perception of structure) variables, and until the interaction effects from all these levels as well as the main effects of each are understood, then it will continue to be impossible to develop predictive accuracy with reference to juvenile delinquency."

The purpose of this study was to form just such a design or model.

Admittedly, we are dealing with an almost unlimited number of variables, but for practical purposes, at one point, we must choose a given number of variables, and then assume that outside variables have random effects, and that any influence important to the dependent variable has been included within the system we are testing.

Based on our conceptions of the ideal prediction instrument (outlined in chapter two), we proposed the following preliminary prediction formula:

$$\text{DEL} = (\text{FC}) \cdot (\text{PEO}) \cdot (\text{PO}) \cdot (\text{SE}) \cdot (\text{TR})$$

Within the variable, PEO, we are concerned with three possible 'others': parents, teachers and peers. Depending on the other factors in the model, one or a combination of these three 'others' may produce a better predictive model. If, for example, family cohesion (FC) were high, then we might expect that the inclusion of perceived expectations--parents, would be very important, since the parents' expectations might be very influential. If, on the other hand, family cohesion were low, the inclusion of perceived expectations--parents might be a wasted variable with no predictive capacity at all, since the parents' expectations probably would have little or no influence on the child's behavior. Reasoning along these lines, we could arrive at several modified versions of the initial formula.

$$\text{DEL} = (\text{FC}) \cdot (\text{PEO}_{\text{parents}}) \cdot (\text{PO}) \cdot (\text{SE}) \cdot (\text{TR})$$

$$\text{DEL} = (\text{FC}) \cdot (\text{PEO}_{\text{teachers}}) \cdot (\text{PO}) \cdot (\text{SE}) \cdot (\text{TR})$$

$$\text{DEL} = (\text{FC}) \cdot (\text{PEO}_{\text{peers}}) \cdot (\text{PO}) \cdot (\text{SE}) \cdot (\text{TR})$$

We could also have models involving the many possible combinations of two or more of these three separate 'others'. In order to get some initial indication of the relative or differential importance of parents, teachers, and peers, we asked the subjects the following questions.

"Perhaps some of the people you know now should be able to help you reach goals you desire. For each of the following, indicate how much they would be able to help you reach your goals?
How about your mother (teachers, best friends,)?
How much will she (they) be able to help you reach your goals?"

will be able
to help very
much

1 2 3 4 5 6 7

will not be
able to help
much at all

Since we did not directly ask the subjects how important the expectations of parents, teachers and peers were, we substituted for this omission by assuming that the instrumental (or goal-reaching) relevance of these 'others' might be at least a partial indication of the influence of their expectations.

The results from these questions indicate very little difference in the instrumental relevance of parents, teachers, or peers.

<u>Significant other</u>	<u>Mean score</u>	<u>Standard Deviation</u>
Parents	2.63	1.57
Teachers	2.86	1.73
Peers	2.62	1.49

From the above distribution, we can not tell which subjects consider parents teachers and peers instrumentally relevant. We know only that, generally, these three 'others' are equally important sources of aid in reaching goals, and we are assuming here that if the 'others' instrumental relevance is high, the influence of their expectations on behavior, might have some predictive capacity. Hence, we will incorporate the perceived expectations of parents, teachers, and peers into our preliminary prediction model as three separate variables.

Weighting System: Having noted that the three different 'others' might possibly have equal and important influences on behavior, we must now find some means of manipulating all the variables in order to arrive at an efficient predictive instrument. One possibility is to assign, to each variable, a positive or negative sign signifying

predisposes to delinquency (+)
predisposes to non-delinquency (-).

However, this type of assignment poses numerous difficulties such as the existence of many mathematically possible combinations of factors which are non-existent in reality, different combinations of factors (+ and -) which yield identical predictions etc.. This first method would make it very difficult for the researcher to filter out the realistic differential patterns of interaction among the factors, except on the basis of his insight, imagination, and intuition.

The method chosen to overcome these problems was to assign differential weights to each variable or group of variables. The initial weighting system is not entirely arbitrary. The sparse empirical work which has been done in support of the theories from which several of the variables were taken (Reckless, 1956-57; Elliott, 1962; Palmore and Hammond, 1964; Sherif, 1964) leads us to hypothesize that

- a) the perceived opportunity structure and the perceived expectations of peers will probably be the most influential variables.

Hence, they will be weighted the heaviest, as follows.

<u>PO</u>	<u>score range</u>	<u>weight factor</u>	<u>PEO(peers)</u>	<u>score range</u>	<u>weight factor</u>
Low	1	4	Often del.	1	4
	2	4	Sometimes del.	2	2
	3	4	Seldom del.	3	1
	4	4	Never del.	4	.25
Medium	5	2			
	6	2			
Med. High	7	1			
High	8	.50			
Very High	9	.25			

- b) the family situation, as perceived by the subject, and the subject's self-esteem will be the next most influential predictor variables.

They will be weighted a little lighter, as follows.

<u>FC</u>	<u>score range</u>	<u>weight factor</u>	<u>SE</u>	<u>score range</u>	<u>weight factor</u>
Low	1	3	Low	7	3
	2	3		6	3
Medium	3	2		5	3
Med. High	4	1	Medium	4	2
High	5	.50	Med. High	3	1
Very High	6	.33	High	2	.50
			Very High	1	.33

- c) teacher rating and the perceived expectations of parents and teachers will be the least influential, and will probably serve only to sharpen the efficiency of the prediction.

They will be weighted the lightest, as follows.

<u>PEO(teachers)</u>	<u>score range</u>	<u>weight factor</u>	<u>PEO(parents)</u>	<u>score range</u>	<u>weight factor</u>
Often del.	1	2		1	2
Sometimes del.	2	2		2	2
Seldom del.	3	1		3	1
Never del.	4	.50		4	.50

<u>TR</u>	<u>score range</u>	<u>weight factor</u>
Low	1	2
	2	2
	3	2
	4	2
Medium	5	1
High	6	.50
Very High	7	.50

Using this weighting system, each individual subject will receive a score: the higher the score, the more likely will be the prediction of delinquency involvement. For example, the most delinquent case possible (using PEO as three separate variables) would have the following score.

$$4 \times 4 \times 3 \times 3 \times 2 \times 2 \times 2 = 1152$$

The least delinquent case would likewise have the following score.

$$.25 \times .25 \times .33 \times .33 \times .50 \times .50 \times .50 = .00087$$

The reason for the combination of integers and fractions is as follows. Probably very few subjects will fall at extreme ends of the score continuum; most will have combinations of factors which both predispose them to delinquency and prevent them from delinquency involvement. If we were to assign merely a one (1) to those factors which discouraged delinquency, the presence of several of these variables in combination with a few strong variables which predispose one to delinquency would automatically predict future delinquency because of the failure to take into account the presence of the 'non-delinquent' factors. For example, if we assigned a one (1) to 'non-delinquent' variables, a subject might have the following fairly score:

$$4 \times 4 \times 3 \times 1 \times 1 \times 1 \times 1 = 48$$

However, by our system, which attempts to take into account counteracting effects of 'non-delinquent' variables, the same subject might have the following score:

$$4 \times 4 \times 3 \times .33 \times .50 \times .50 \times .50 = 2$$

It would then be much less likely that he would be predicted as a future delinquent.

Hypotheses: Since we are assuming that some of the variables have stronger influences than others, it is logical to predict that the presence of a variable in one form may weaken the influence (and therefore the predictive capacity) of another weaker variable. To a certain extent, we have predicted interaction by the differential variable weights. However, we can also postulate the following preliminary hypotheses, keeping in mind that 'non-delinquent' means a low total score, and 'delinquent' means a high total score. Combinations containing any of:

- 1) Low PO and PEO-peers (delinquent)
- 2) Low PO and Low SE
- 3) Low FC and Low PO

regardless of the form of the other variables, will predict likely delinquency involvement. We can further hypothesize that:

a) High FC, High PO, and PEO-peers (del.) = non-delinquent

(A happy family environment plus expectations of legitimate success may cancel out the the influence of delinquent peers.)

b) High FC, Low PO, and PEO-peers (non-del.) = delinquent

(Even though the family situation is favorable, and friends do not expect deviance, illegitimate avenues will be disproportionately used when legitimate opportunities are restricted.)

c) Low FC, High PO, PEO-peers (del.), and High SE = non-delinquent

(Expectations of school or occupational success have provided needed self-esteem, and play a compensating role, protecting the individual from the influence of both family and peers.)

d) High FC, Low SE, and PEO-peers (del.) = delinquent

(A favorable family situation has failed to develop a positive self-concept in the individual, so the influence of the family is discounted in favor of the strong influence of the peers.)

Obviously, there is an unlimited number of combinations, with a correspondingly unlimited number of explanations.

It is part of the goal of this project to delineate the various probable combinations of the seven variables.

The hypotheses put forward above will merely be used as guides in modifying the original formula, and as safeguards against unexpected results from the statistical manipulation of the variables.

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CHAPTER FIVE

METHODOLOGY AND DATA ANALYSIS

Sample--Method and Composition: In developing a delinquency prediction instrument, we should have both delinquents and non-delinquents in our sample, in order to be able to test the discriminatory power of the device. The sample for this study was composed of subjects chosen (non-randomly), to take part in a delinquency control program in Seattle, Washington, called Opportunities For Youth, 1964. For the purposes of the present study, both experimental and control groups were used, for two reasons: a) only variables measured at the beginning of the 1964 project were used in the present study (except for the delinquency involvement to be predicted) and b) in the final analysis of the 1964 project, the experimental program was not successful in producing changes in variables involved here. (See Hackler, 1966 for the final report of the project.)

The 200 respondents for this study are almost all of the males, aged 13 to 15, who at the beginning of the 1964 project, lived in or around one of four low-rental housing units in the city of Seattle. Part of the data to be used in the development of our model was gathered by the administration of a questionnaire to the boys during the beginning of their involvement in the above project. The questionnaires were administered anonymously,

but a system of numbers was used to link each questionnaire with other data gathered on the boys. These remaining data came from teachers, school disciplinary records, and from police records for the years 1964 and 1965-1967, inclusive.

Table 1 shows the composition of the sample according to race and social class. See appendix, page 164, for the question which was used to measure social class.)

TABLE 1

COMPOSITION OF SAMPLE BY RACE AND SOCIAL CLASS

<u>RACE</u>			<u>SOCIAL CLASS</u>		
	<u>number</u>	<u>%</u>		<u>number</u>	<u>%</u>
Negro	116	58.0	Middle	25	12.5
White	75	37.5	Low	158	79.0
Oriental	2	1.0	Unclassified	17	8.5
Indian	1	.5			
Mixed or	6	3.0			
unclassified					
	N=200	100.0%		N=200	100.0%

From the table, it is clear that our sample was divided into two major ethnic groups, Negroes and Whites. It might be argued that, in constructing a prediction model, one should take into account the differences existing between ethnic groups. However, our aim was somewhat broader: we wanted to construct a prediction instrument which could predict delinquency involvement in almost any ethnic group living in a western culture. All our variables represent basic socio-psychological

concepts which should play some role in influencing behavior, regardless of the race of the individual human being. In contrast to the ethnic composition, the social class distribution is much more homogeneous. Classified according to their father's occupation, most of the sample fell into the low-class category, with a few in the middle class, and none in the upper classes at all. Part of the reason for this skew can be explained by our need to include in the sample, a good portion of subjects who were already involved in delinquency. By taking a group of lower-class males, we felt more assured of getting more subjects who had committed delinquent acts, than by taking a random sample from a population of male juveniles.

Table 2 shows the number and percentage of subjects involved in delinquency, defined by our several operational definitions.

TABLE 2
DEGREE OF DELINQUENCY INVOLVEMENT
OF SUBJECTS

Operational definition of delinquency	<u>delinquents</u>		<u>non-delinquents</u>	
	n	%	n	%
From questionnaire:				
D1) Self-reported delinquency	64	32.0	136	68.0
D2) Police contact- acquaintances	71	35.5	129	64.5
D3) Court contact- acquaintances	69	34.5	131	65.5

TABLE 2(continued)

<u>Operational definition of delinquency</u>	<u>delinquents</u>		<u>non-delinquents</u>	
	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>
From School Records:				
D4) Counsellor referrals	96	48.0	104	52.0
Official Police Contacts:				
D5) Police record-1964	83	41.5	117	58.5
D6) Police record-1965 to 1967, inclusive.	60	30.0	140	70.0

The first five measures indicate delinquency involvement for subjects aged 13 -- 15 years. The last measure was taken when the same subjects were between 16 and 18. An interesting thing can be noted here. There was a decrease in the over-all percentage of subjects who had gotten police records. At the beginning of the project, 41.5% of the sample had police records. In the following three-year period, only 30% of the same sample had recorded contact with the police, indicating that there may be a greater amount of delinquent activity in the earlier juvenile years. However, rather than the total amount of involvement of a certain group in delinquency, we should be concerned with seriousness and recidivism. We assumed that, for the later age period, those still engaging in delinquent acts, are involved for more permanent and serious reasons than 'fun' or 'accident', two reasons which first engage many younger juveniles (Cohen, 1955; Matza, 1964; Short and Strodtbeck, 1965). Consequently,

a measure of delinquency involvement taken between the ages of 16 and 18 probably gives a more accurate picture of the subject's permanent delinquent habits. Hence, if we can develop an instrument using information available in the early juvenile age bracket, which will successfully predict the probability of delinquency in the later juvenile years (probably the more habitual, serious delinquency), we could effectively contribute to subsequent delinquency prevention.

Initial Correlations: Since we used more than one operational definition for some of our concepts, the first step in the data analysis was to explore the interrelationships between each of the measures. Firstly, we wanted to know if the different indicators of each concept measure the 'same thing'. If there is a negative relationship between two measures of the same variable, then they are obviously measuring either different aspects of the concept, or two different concepts which we have failed to delineate. Secondly, an initial intercorrelation process will give preliminary insight into the relationships of the model we proposed. Failure to find at least some correlation between the variables at this point would call for a re-examination of our concepts, our measures, and our initial weighting system, and might warn us about unexpected and unexplainable results in later modifications of our first model.

TABLE 3

INTERCORRELATIONS OF ALL INDICES FOR ALL VARIABLES AS MEASURED BY GAMMA (N = 200)

	D1	D2	D3	D4	D5	D6	FC	PE01	PE02	PE03	PO1	PO2	PO3	SE1	SE2	SE3	TR
D1		.51	.52	-.02	.15	.37	.32	.77	.84	.62	.21	.37	.15	.25	.30	.04	.25
D2			.79	.25	.33	.39	.29	.35	.41	.44	.19	-.30	.29	.06	.43	-.03	.22
D3		I		.47	.29	.40	.30	.50	.45	.18	-.03	-.09	.10	.05	.49	-.10	.37
D4					.42	.40	.35	.12	-.10	.19	-.00	-.03	-.06	-.10	.34	.04	.66
D5						.50	.31	.18	.21	.04	.20	-.06	.09	-.18	.15	-.19	.41
D6					II		.25	.35	.34	.53	.03	.07	.27	.22	.28	-.19	.28
FC								.38	.45	.30	.56	.19	.04	.46	.44	.14	.25
PE01									.90	.93	.22	.06	.22	.10	.42	.05	.32
PE02										.74	.25	-.10	-.10	.34	.62	-.01	.25
PE03									III		.32	.12	.24	.22	.50	.13	.55
PO1												.30	.48	.27	.36	.09	.03
PO2													.47	.22	.15	-.08	-.07
PO3												IV		.35	.20	-.16	-.16
SE1															.75	.23	.05
SE2																.09	.35
SE3																	
V																	-.02

D1 Self-Reported Delinquency

D2 Police Contact of Acquaintances

D3 Court Contact of Acquaintances

D4 Counselor Referrals

D5 Police Record Before 1965

D6 Police Contact 1965-7 Delinquency

FC Family Cohesion

PE01 Perceived Expectation of Peers

PE02 Perceived Expectation of Parents

PE03 Perceived Expectation of Teachers

PO1 Perceived School Opportunity

PO3 Perceived Job Opportunity

PO3 Perc. General Opport.

SE1 Self Esteem (You O.K.)

SE2 Self Esteem (Sum of others)

SE3 Self Esteem (Discrepancy Score)

TR Teacher Rating

Table 3 gives the intercorrelations between each of the indices, arranged in anticipation of positive relationships between the measures, as proposed in the preliminary weighting system. Boxes labelled I to V outline the correlations among the different operational definitions of a single concept. Since no negative relationships appear in these boxes, we have some confidence that our several operational definitions are in fact consistently measuring the 'same thing'. Of course, since some of the indicators were similar in their construction, we had expected a reasonably high positive relationship among these. The measures, PO2 and SE3 are the only possible exceptions: they show very low correlations with the other operational definitions of the two respective concepts, perceived opportunity and self-esteem.

The second question that is partially answered by this table concerns the relationships between the measures of delinquency involvement and the other variables. Looking down the columns headed by FC1, PEO3, SE2, and TR1, we find all positive relationships between these variables and the six definitions of DEL (delinquency involvement), including the measure, three years later, ED6, which is the one we are attempting to predict. This finding supports in general our anticipations for positive relationships, and suggests that these variables may each have some predictive capacity. The columns headed PEO2, PO1, PO3, and SE1 show almost

all positive relationships with the definitions of DEL, with the exception of one or two cases at the most, suggesting that the predictive ability of these variables might be less powerful than the first five mentioned, but still present. Finally, variables P02 and SE3 contradict our preliminary hypotheses concerning positive relationships. We could suggest that these two variables be retained as 'negative' predictors of delinquency i.e. those subjects with high job opportunity (P02) and high self-esteem (SE3) would be likely candidates for delinquency involvement. However, the fact that the remaining two out of three of each of the definitions of perceived opportunity and self-esteem show generally positive relationships with all six measures of DEL suggests that these last two measures, P02 and SE3, might be discarded as inaccurate indicators of their concepts, or possibly indicators of different aspects of the concepts.

The remaining variables showed the following positive relationships with D6 (the final measure of DEL), and the variable we will be attempting to predict.

FC1 -- .25	PEO1 -- .35	P01 -- .03	SE1 -- .22
TR1 -- .28	PEO2 -- .34	P03 -- .27	SE2 -- .28
	PEO3 -- .53		

Although P01 had generally positive relationships with the earlier measures of delinquency, since we are attempting to predict the later measure, we should be using variables

which are consistently related to both the earlier and later definitions of delinquency involvement (DEL). Hence, after also discarding PO1 as a potentially poor predictor, we were left with the following variables in our preliminary model.

MODEL A

$$\text{DEL} = \text{FC} . \text{PEO1} . \text{PEO2} . \text{PEO3} . \text{PO} . \text{SE1} . \text{TR}$$

or

MODEL B

$$\text{DEL} = \text{FC} . \text{PEO1} . \text{PEO2} . \text{PEO3} . \text{PO} . \text{SE2} . \text{TR}$$

(where SE1 is defined as 'whether we feel we are O.K.' and SE2 is defined as 'summary score of how three significant others feel about us')

The remainder of chapter five deals with the most important data analysis: specifically, the attempts made to improve the preliminary model in order to achieve the most effective prediction instrument possible.

Results of the Preliminary Model: Let us recall that we are looking for several things in a good prediction instrument.

1. The smallest possible residual or unpredictable category.
2. High efficiency i.e. the category which predicts delinquents should contain the majority of future delinquents.
3. High accuracy i.e. the category which predicts delinquents should contain only or mostly future delinquents and none or few future non-delinquents.
4. The multi-variable instrument should predict with higher efficiency and accuracy than any one of the single variables of which it is composed.
5. The category which predicts future delinquency should also contain the majority of the most serious delinquents.

In the preliminary run, we had two models, differing only in their operational definitions of self-esteem. The weighting system as outlined in chapter four, was constant for both Model A and B. Each subject was assigned a score, based on the multiplied values of the seven variables. According to the score range into which the subject fell, he would be predicted as:

- 1) least delinquent or low delinquency (raw score-0 to .199),
- 2) more delinquent or medium delinquency (raw score-.200 to 1.999)
- 3) most delinquent or highest delinquency (raw score-2.00 and up)

with the 'most delinquent' hopefully falling predominantly in the highest score category. However, in dealing with the model, for simplification purposes in the tables,

we have labelled the categories simply non-delinquent, residual (since the medium range is difficult to predict) and delinquent. Also, in all the following tables dealing with the prediction model, the number of delinquents is defined as the number of cases with police contacts during the years 1965-1967 (D6).

The categories of the score range were chosen for two reasons. First, the sample seemed to divide 'naturally' into approximately these three groupings, a large number of cases falling into the very lowest score range, as expected, and two other smaller groups, equal in size to each other, one with intermediate scores, and one with very high scores. Secondly, a simple, straightforward score range, as outlined above, should make a prediction model much more practical, and increase the probability of its being used. Except for these two reasons, (natural division and convenience) the division of the scores into these three categories was somewhat arbitrary.

In Table 4, the results of the preliminary tests, columns one, two, and four are self-explanatory; they merely give the number of cases falling into each category and the number of those cases which are delinquent and non-delinquent, defined by the number of cases having police contact after three years, our final definition of delinquency (D6). The third column, the probability of being a future delinquent is simply the number of delinquents in each category divided by the total number of cases in that category (column two divided by column one

TABLE 4

RESULTS OF THE PRELIMINARY TEST OF THE PREDICTION INSTRUMENT, MODEL A AND MODEL B.

MODEL A					
PREDICTIONS	NUMBER OF CASES	NUMBER--PROBABILITY OF DELINQUENTS	NUMBER--PROBABILITY OF NON-DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS	
1)NON-DELINQUENT	118 (59%)	24 (40%)	94 (67%)	9 (30%)	.08
2)RESIDUAL	46 (23%)	17 (28%)	29 (21%)	7 (23%)	.15
3)DELINQUENT	36 (18%)	19 (32%)	17 (12%)	14 (47%)	.39
	N = 200	N = 60	N = 140	N = 30	
MODEL B					
PREDICTIONS	NUMBER OF CASES	NUMBER--PROBABILITY OF DELINQUENTS	NUMBER--PROBABILITY OF NON-DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS	
1)NON-DELINQUENT	109 (54%)	22 (37%)	87 (62%)	8 (27%)	.07
2)RESIDUAL	47 (24%)	11 (18%)	36 (26%)	5 (17%)	.11
3)DELINQUENT	44 (22%)	27 (45%)	17 (12%)	17 (57%)	.39
	N = 200	N = 60	N = 140	N = 30	

or $24/118 = .20$). The fifth column, the probability of future delinquency, is one minus the probability of future non-delinquency, (or column four divided by column one: $1.00 - .20 = .80$ or $94/118 = .80$). Column six gives the number of serious delinquents falling into each score category and column seven, the probability of any subject in a particular category being a serious delinquent (i.e. the number of serious delinquents divided by the total number of cases in each category). The delinquents were classified as being serious or not, according to the type of behavior for which each subject was apprehended. The following types of behavior include all offenses which were listed as reasons for the apprehension of our subjects by the police, three years after the original delinquency prevention project (D6).

Serious

assault (aggravated or
non-aggravated)
burglary or robbery
property damage
grand larceny
petty larceny or shoplifting
possession of stolen goods

Non-serious

breaking curfew
giving liquor to a minor
joy-riding (auto-theft)
malicious mischief
juvenile drinking
fornication
glue sniffing
resisting police
runaway
profanity
disturbance or
disorderly conduct
carrying concealed weapons
prowling or trespassing
injurious living conditions

If a subject was apprehended one or more times for any of the first group of offenses, he was labelled 'serious'.

If a subject was apprehended three or more times for one

or a combination of any of the second group of offenses, he was also labelled serious. (Although the first apprehension on a non-serious offense seldom resulted in any action, three or more apprehensions almost always resulted in detention in some rehabilitation setting. Hence, these subjects were also labelled as 'serious'.) Hopefully, those delinquent subjects falling into the 'delinquent' category will also be the more serious offenders, while delinquent subjects falling into non-delinquent categories (i.e. incorrectly predicted) will be those involved only in 'minor indiscretions'..

Before discussing Table 4 directly, let us recall that, according to chance prediction, the subjects in our sample have 7/10 chances of becoming or remaining non-delinquent (.67) and 3/10 chances of becoming delinquent (.33). (See Chapter 2; Criteria of Evaluation) Did our prediction device improve upon the accuracy of this prediction for a large enough part of our sample to make its use practical? In model A, (Table 4) prediction for category 2), containing about 1/4 of the sample, is little better than chance (.63 and .37¹ as compared with .67 and .33). However, the other three-quarters of the sample fall into the remaining two categories, for which the predictive accuracy is much greater than chance. For example, we now can say that, for any subject falling into the score range represented here by category 3) (delinquents), we can be sure 53 out of 100 times (.53) that he will be a future delinquent, as compared with

chance prediction of .33. Likewise, for any subject falling into category 1 (non-delinquent), we can be sure 80 out of 100 times (.80) that he will be non-delinquent in the future, as compared with chance prediction of .67. Hence, we have an improvement in the accuracy of our predictions, for at least 75% of our sample. On the other hand, the efficiency of Model A is quite low -- only 32% of the known delinquents in our sample fall into the delinquent category i.e. the prediction device only spotted or picked out about 1/3 of the actual future delinquents. However, let us look at the distribution of 'serious' delinquents (as herein defined) across the three categories. The trend is what we had hoped for. The probability of anyone in the 'non-delinquent' category being a serious delinquent is only .08. The probability of anyone in the 'delinquent' category being a serious delinquent is .39. The prediction device, then does seem to make a meaningfully large discrimination between serious delinquency and minor and mild discretions. Finally, we might say that Model A has a fair amount of over-all discriminatory power. That is, it displays, at opposite ends of the continuum (delinquent-residual-non-delinquent) probabilities separated by a fairly large margin. For example, the probability of delinquency is only .20 at the non-delinquent end of the continuum but .53 at the delinquent end. Similarly, for the probabilities of non-delinquency, .80 and .47. Hence,

the larger the difference between the probabilities for delinquency (or non-delinquency) at opposite ends of the predicted continuum, the greater is the discriminatory power of the instrument.

Model B, using a different operational definition of self-esteem from Model A, is a decided improvement. We still have approximately 1/4 of our sample falling into the residual category, but the probabilities of delinquency and non-delinquency for subjects in this category are somewhat improved over chance. If we were applying this model to a sample of people, we might be tempted to predict subjects falling into category 2 as future non-delinquents, and would be correct in 77 out of every 100 cases.

However, again for the purposes of simplification, we will continue to refer to this middle category as residual, and concentrate basically on the remaining two categories, hoping mainly that this middle category will be in accord with the general trend we are looking for i.e. subjects with the highest scores are most likely candidates for future delinquency; subjects with the lowest scores are likely to remain non-delinquent.

Model B shows limited improvement over Model A in distributing serious delinquents, although Model B does include 10% more of the serious delinquents within the 'delinquent' category, and the probability of serious delinquency for subjects in the 'non-delinquent' category is slightly lower than in Model A. The accuracy

of Model B is much greater than chance, and a worthwhile improvement over Model A. If a subject falls into category 3, (i.e. predicted to be a future delinquent) we can be sure that 61 out of every 100 cases of likely future delinquents will actually become delinquent, as compared with only 53 of every 100 cases in category 3 using Model A. In both models, the probability for a subject predicted as non-delinquent, of actually becoming delinquent, is only .20. However, using Model B, the probability of 'predicted delinquent' subjects actually becoming delinquent is .61, a substantial increase over the same probability in Model A (.53). So, with an improvement in accuracy comes an automatic increase in the power of discrimination. Since the accuracy of predicting delinquents has increased from Model A (.53 to .61), the difference between the probabilities of delinquency at opposite ends of the continuum has also increased. Hence, we can say that Model B has more discriminatory power than Model A. Finally, by including a greater percentage of our known delinquents in the 'delinquent' category, Model B (45%) shows greater efficiency than Model A (32%).

Although Model B shows little improvement over Model A in the size of the residual category, it definitely demonstrates a useful increase in accuracy, efficiency, and discriminatory power. Hence, Model B will be referred to as the preliminary model and the unsuccessfully used definition of self-esteem (the subject's definition of himself--SE1)

will be discarded.

Modifications of the Preliminary Model: Even though Model B supports generally our hypotheses concerning the strength and influence of the variables in a multiplicative model by demonstrating the trends we had expected, improvement in both accuracy and efficiency would make the instrument more useful for practical application. There are at least three possible sources of weaknesses in the instrument. First, we might suggest that the variables involved are not good predictor variables, and are more or less randomly related to delinquency. However, we must overrule this explanation, or find ourselves questioning most of the empirical and theoretical work which has been done on delinquency to date. Besides, if we were to choose this first reason, we could continue the study no further.

The inaccuracy of the weighting system might provide a second reason for the weaknesses of the preliminary model. We can revise the weighting system. According to the correlations we found between the variables and delinquency (see page 81), we tried two general modifications of Model B. The first (Mod.B1) we weighted perceived expectations of others-teachers (PE03) the heaviest, perceived expectations of others-peers (PE01) and perceived expectations of others-parents(PE02) a little lighter, and family cohesion (FC), perceived opportunity (PO),

self-esteem (SE2), and teacher rating (TR), the lightest. The second modification, ModB2, we weighted all the variables equally, except for perceived expectations of others-teachers (PE03) which we weighted a little heavier since it was the most highly associated (as measured by gamma) with delinquency involvement. The results are outlined in Table 5.

Although the actual numerical score ranges differed slightly from the preliminary model, reflecting the changes in the weighting system, the sample still seemed subject to the same 'natural' divisions into three basic categories, as occurred with the use of Models A and B. At first glance, we rejected ModB2 both as less accurate and less efficient than the preliminary model (Model B), as well as showing insignificant changes in the number in the residual category, and the distribution of serious delinquents. ModB1 has the same accuracy (.61), but less efficiency (only 38% as compared to 45% of actual delinquents fall into category 3) than Model B, and no significant change in either of the other two evaluative criteria. These attempts at modifying the weighting system of individual variables were unsuccessful in improving the prediction instrument.

The next steps were to find out if any of the single variables were such poor predictors that they were, so to speak, the 'weak links in the chain', and to simply remove them. In the process, the fourth criterion of evaluation

TABLE 5

RESULTS OF THE MODIFICATION OF PRELIMINARY MODEL B THROUGH CHANGES IN THE
WEIGHTING SYSTEM MOD B1 AND MOD B2

MOD B1 PREDICTIONS	NUMBER OF CASES	NUMBER--PROBABILITY OF DELINQUENTS	NUMBER--PROBABILITY OF NON-DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS
1)NON-DELINQUENT	120 (60%)	26 (44%)	94 (67%)	9 (30%)
2)RESIDUAL	42 (21%)	11 (18%)	31 (22%)	5 (17%)
3)DELINQUENT	38 (19%)	23 (38%)	15 (11%)	16 (53%)
	N = 200	N = 60	N = 140	N = 30

MOD B2 PREDICTIONS	NUMBER OF CASES	NUMBER--PROBABILITY OF DELINQUENTS	NUMBER--PROBABILITY OF NON-DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS
1)NON-DELINQUENT	117 (58%)	25 (42%)	92 (66%)	9 (30%)
2)RESIDUAL	43 (22%)	12 (20%)	31 (22%)	5 (17%)
3)DELINQUENT	40 (20%)	23 (38%)	17 (12%)	16 (53%)
	N = 200	N = 60	N = 140	N = 30

which we listed in detail at the end of chapter two, will be considered. Do any of the single variables of which the instrument is composed predict better than the instrument itself? In order to look for single weak predictor variables which could be removed and to find out if a single variable might be a good predictor of delinquency on its own, we computed the number of cases (both delinquent and non-delinquent) falling into each category of each of the seven variables (see chapter four, page 70, for the categories of the individual variables). For example, we outlined the number of subjects with low perceived opportunity (PO), medium PO, medium high PO etc., and broke the categories down into delinquents and non-delinquents. Let us look first at the two single variables which we found to be obviously weak links in the prediction instrument, and obviously worse predictors than our multi-variable device.

In Table 6, we see that family cohesion (FC), on its own, predicted delinquency involvement no better than chance throughout its whole range of scores, and its discriminatory power was weak. It was almost as likely for a boy with low family cohesion as for a boy with high family cohesion, to become involved in delinquency. Only 15% of our known delinquents had low family cohesion, while almost as many delinquents (60%) as non-delinquents (66%) had from medium high to very high family cohesion. Finally, the distribution of serious delinquents was the opposite

TABLE 6

DISTRIBUTION OF THE SAMPLE INTO CATEGORIES OF THE SINGLE VARIABLES OF FAMILY COHESION (FC)
AND SELF ESTEEM (SE2)

FAMILY COHESION (FC1)

	NUMBER OF CASES	NUMBER--PROBABILITY OF DELINQUENTS	NUMBER--PROBABILITY OF NON-DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS
1)LOW	30 (15%)	9 (15%) .30	21 (15%) .70	4 (13%) .13
2)MEDIUM	41 (20%)	15 (25%) .37	26 (19%) .63	6 (20%) .15
3)MED HI, HI & VERY HIGH	129 (65%)	36 (60%) .28	93 (66%) .72	20 (67%) .16
	N = 200	N = 60		N = 30

SELF ESTEEM (SE2)

	NUMBER OF CASES	NUMBER--PROBABILITY OF DELINQUENTS	NUMBER--PROBABILITY OF NON-DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS
1)LOW	89 (44%)	33 (55%) .37	56 (40%) .63	20 (67%) .23
2)MEDIUM	52 (26%)	13 (22%) .25	39 (28%) .75	5 (17%) .10
3)HIGH	59 (30%)	14 (23%) .24	45 (32%) .76	5 (17%) .08
	N = 200	N = 60	N = 140	N = 30

of the expected trend. The highest percentage of serious delinquents fell into category 3, high family cohesion. This fact suggested rather strongly that a measure of family cohesion at one point in time, is not a good single predictor of later delinquency involvement. The favorableness of the family situation may be very influential in general character formation, but does not seem to be related in a 'causal' way, specifically to delinquency. Because it seemed impossible to improve the efficiency or accuracy of this variable by simply changing its weighting system, it was excluded as a predictor variable from the next modification of Model B, to be discussed later.

The distribution for self-esteem (see Table 6--SE2--summary score of others' evaluations of us) only weakly demonstrated our expected trend (i.e. low self-esteem related to high delinquency). More specifically, the probability for those with low self-esteem of actually becoming delinquent, is little better than chance (.37 as compared with .33 for chance). Although self-esteem did discriminate between serious and mild delinquency, its discriminatory power was very weak i.e. the difference between probabilities for the same behavior at opposite ends of the 'high self-esteem--low self-esteem' continuum, was very low. These findings led us to suspect the correctness of the original hypothesis that low self-esteem and

high delinquency involvement are positively associated. Searching for sources of weaknesses in this variable, we returned to the definition of self-esteem which was originally negatively correlated with delinquency (i.e. SE3--the discrepancy score between real and ideal self) and omitted from the model because of that.

In Table 7, defining self-esteem as the discrepancy between real and ideal self, we found that for those in the high self-esteem category, there was a greater probability of becoming delinquent (.33) than for those with low self-esteem (.25). This trend, differing from what was originally hypothesized about the relationship between self-esteem and delinquency, suggested that there is a difference in the amount and type of influence between how we think others evaluate us, SE2, and our own conception of the discrepancy between our real and ideal selves, SE3. These two different definitions of self-esteem lead us to speculate that some delinquents may perceive low evaluations in the eyes of 'others', while simultaneously feeling no great discrepancy between their real and ideal selves. Hence, in using self-esteem as part of a prediction device, one must clearly describe and keep in mind, the particular definition being used. The final definition of self-esteem chosen for use in the present study, SE2, concerns itself with others' evaluations of us.

In the initial correlations (page 81), we found

TABLE 7
DISTRIBUTION OF THE SAMPLE INTO CATEGORIES OF THE SINGLE VARIABLE,
SELF-ESTEEM (SE3)

SELF-ESTEEM (SE3)	NUMBER OF CASES	NUMBER--PROBABILITY OF DELINQUENTS	NUMBER--PROBABILITY OF NON-DELINQUENTS
1)LOW	103 (51%)	26 (43%) .25	77 (55%) .75
2)MEDIUM	36 (18%)	14 (24%) .38	22 (16%) .62
3)HIGH	61 (31%)	20 (33%) .33	41 (29%) .67
	N = 200	N = 60	N = 140

self-esteem, SE2, to be weakly but inversely related to later delinquency involvement. Even though the predictive accuracy of this definition as a single variable was little better than chance (see Table 6), its redeeming factor as part of a larger prediction model, was that the top score category contained over half (55%) of our known delinquents, and it did discriminate slightly between serious and mild delinquency. In combination with the other variables which pick out fewer delinquents (low efficiency), but predict with higher probability (better accuracy), this definition of self-esteem may be useful as a predictor variable. Hence, self-esteem (SE2) was retained in the next modification, but with a change in weights, since both Tables 6 and 7 seem to demonstrate that low self-esteem does not seem to 'promote' delinquency involvement as much as high self-esteem seems to 'retard' it.

We have looked at family cohesion and self-esteem as single predictor variables and found them obviously much less effective, on their own, than the prediction model. Let us now continue our discussion of single variables as predictors, by looking at the remaining five variables (perceived opportunity, the perceived expectations of peers, parents, and teachers, and teacher rating) which all consistently demonstrated the trend we are looking for i.e. those in the 'delinquency-prone' category have the highest probability of becoming delinquent, and include the majority of serious delinquents, and vice-versa for

non-delinquents.

In order to compare the predictions of each variable with the predictions of the model, we must group our subjects' scores using the model, in order to get, in each case of comparison between a single variable, and the model,

- a) an equal number of categories and
- b) an equal number of subjects in each category.

Since the cutting points of the categories are different for each variable, we must separately redefine the category boundaries of the scores given by the model, for each of the five variables. For example, in the next table (Table 8), the first variable (perceived opportunity) divides the sample into four groups, containing 4%, 13%, 28% and 55% of the total sample. To make the score distributions of the model comparable (in order to find out which is the better predictor), we must regroup the scores into four categories; the first containing the top 4% of the scorers, the next containing the next 13%, then the next 28%, and finally the remaining 55% of the sample.

Table 8 shows that, in every case, the model is as good, or better than any single variable as a predictor of delinquency. In each case, its accuracy and efficiency are higher, its general discriminating power is stronger, and using the scores from the model, the discrimination between serious and mild delinquency is sharpened. Let us take a few specific examples. Comparing the model to perceived opportunity as a predictor variable, we find

TABLE 8

COMPARISON OF PREDICTIONS MADE BY MODEL B, AND PREDICTIONS MADE BY THE SINGLE VARIABLES OF PERCEIVED OPPORTUNITY (PO), PERCEIVED EXPECTATIONS OF PEERS (PEO1), PERCEIVED EXPECTATIONS OF PARENTS (PEO2), PERCEIVED EXPECTATIONS OF TEACHERS (PEO3), AND TEACHER RATING (TR).

PERCEIVED OPPORTUNITY (PO)

	NUMBER OF CASES	NUMBER--PROBABILITY OF DELINQUENTS	NUMBER--PROBABILITY OF NON-DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS
1) LOW PO	8 (4%)	4 (7%) .50	4 (3%) .50	1 (3%) .13
2) MEDIUM PO	27 (13%)	11 (18%) .41	16 (11%) .59	7 (23%) .26
3) MED HI PO	55 (28%)	18 (30%) .33	37 (36%) .67	9 (30%) .16
4) HI, VERY HI PO	110 (55%)	27 (45%) .25	83 (59%) .75	13 (43%) .12
	N = 200	N = 60	N = 140	N = 30

MODEL B - MODIFIED TO COMPARE WITH PERCEIVED OPPORTUNITY (PO)

PREDICTIONS	NUMBER OF CASES	NUMBER--PROBABILITY OF DELINQUENTS	NUMBER--PROBABILITY OF NON-DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS
1) HI DELINQUENCY	8 (4%)	5 (8%) .62	3 (2%) .38	3 (10%) .38
2) MED DELINQUENCY	27 (13%)	14 (23%) .52	13 (9%) .48	13 (43%) .48
3) LOW DELINQUENCY	55 (28%)	18 (30%) .33	37 (36%) .67	5 (17%) .09
4) NON-DELINQUENCY	110 (55%)	23 (38%) .21	87 (53%) .79	9 (30%) .08
	N = 200	N = 60	N = 140	N = 30

TABLE 8
(Continued)

TEACHER RATING (TR1)

	NUMBER OF CASES	NUMBER--PROBABILITY OF DELINQUENTS	NUMBER--PROBABILITY OF NON-DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS
1)BAD	74 (37%)	30 (50%) .41	44 (31%) .59	17 (57%) .23
2)MEDIUM	24 (12%)	6 (10%) .25	18 (13%) .75	9 (30%) .37
3)GOOD	102 (51%)	24 (40%) .24	78 (56%) .76	4 (13%) .04
	N = 200	N = 60	N = 140	N = 30

MODEL B - MODIFIED TO COMPARE WITH TEACHER RATING (TR1)

PREDICTIONS	NUMBER OF CASES	NUMBER--PROBABILITY OF DELINQUENTS	NUMBER--PROBABILITY OF NON-DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS
1)HI DELINQUENCY	74 (37%)	30 (50%) .41	44 (31%) .59	21 (70%) .28
2)MED DELINQUENCY	24 (12%)	9 (15%) .37	15 (11%) .63	1 (3%) .04
3)NON-DELINQUENCY	102 (51%)	21 (35%) .21	81 (58%) .79	8 (27%) .08
	N = 200	N = 60	N = 140	N = 30

TABLE 8
(Continued)

PERCEIVED EXPECTATIONS OF OTHERS - PEERS (PEO1)					
PREDICTED DELINQUENCY	NUMBER OF CASES	NUMBER--PROBABILITY OF DELINQUENTS	NUMBER--PROBABILITY OF NON-DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS	
1)OFTEN	32 (16%)	16 (27%) .50	16 (11%) .50	13 (43%) .41	
2)SOMETIMES	23 (12%)	7 (12%) .30	16 (11%) .70	5 (17%) .22	
3)SELDOM	46 (23%)	15 (25%) .48	31 (22%) .67	4 (13%) .09	
4)NEVER	99 (49%)	22 (36%) .22	77 (56%) .78	8 (27%) .08	
	N = 200	N = 60	N = 140	N = 30	

MODEL B - MODIFIED TO COMPARE WITH PERCEIVED EXPECTATIONS OF PEERS (PEO1)					
PREDICTIONS	NUMBER OF CASES	NUMBER--PROBABILITY OF DELINQUENTS	NUMBER--PROBABILITY OF NON-DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS	
1)HI DELINQUENCY	32 (16%)	17 (28%) .53	75 (11%) .47	15 (50%) .47	
2)MED DELINQUENCY	23 (12%)	11 (18%) .48	12 (9%) .52	5 (17%) .22	
3)LOW DELINQUENCY	46 (23%)	12 (20%) .26	34 (24%) .74	2 (7%) .04	
4)NON-DELINQUENCY	99 (49%)	20 (34%) .20	79 (56%) .80	8 (27%) .08	105
	N = 200	N = 60	N = 140	N = 30	

TABLE 8
(Continued)

PERCEIVED EXPECTATIONS OF OTHERS - PARENTS (PEO2)					
PREDICTED DELINQUENCY	NUMBER OF CASES	NUMBER--PROBABILITY OF DELINQUENTS	NUMBER--PROBABILITY OF NON-DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS
1)OFTEN,SOMETIMES	22 (11%)	13 (22%)	.59	9 (6%)	.41
2)SELDOM	21 (10%)	6 (10%)	.29	15 (11%)	.71
3)NEVER	157 (79%)	41 (68%)	.26	116 (83%)	.74
	N = 200	N = 60		N = 140	N = 30

MODEL B - MODIFIED TO COMPARE WITH PERCEIVED EXPECTATIONS OF PARENTS (PEO2)					
PREDICTIONS	NUMBER OF CASES	NUMBER--PROBABILITY OF DELINQUENTS	NUMBER--PROBABILITY OF NON-DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS
1)HI DELINQUENCY	22 (11%)	12 (20%)	.55	10 (7%)	.45
2)MED DELINQUENCY	21 (10%)	15 (25%)	.72	6 (4%)	.28
3)NON-DELINQUENCY	157 (79%)	33 (55%)	.21	124 (89%)	.79
	N = 200	N = 60		N = 140	N = 30

TABLE 8
(Continued)

PERCEIVED EXPECTATIONS OF OTHERS - TEACHERS (PEO3)							
PREDICTED DELINQUENCY	NUMBER OF CASES	NUMBER--PROBABILITY OF DELINQUENTS	NUMBER--PROBABILITY OF NON-DELINQUENTS	NUMBER--PROBABILITY SERIOUS DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS		
1)OFTEN, SOMETIMES	19 (10%)	11 (18%)	.58	8 (5%)	.42	8 (27%)	.42
2)SELDOM	19 (10%)	8 (14%)	.42	11 (8%)	.58	4 (13%)	.21
3)NEVER	162 (81%)	41 (68%)	.25	121 (87%)	.75	18 (60%)	.11
	N = 200	N = 60		N = 140		N = 30	

MODEL B --MODIFIED TO COMPARE WITH PERCEIVED EXPECTATION OF TEACHERS (PEO3)							
PREDICTIONS	NUMBER OF CASES	NUMBER--PROBABILITY OF DELINQUENTS	NUMBER--PROBABILITY OF NON-DELINQUENTS	NUMBER--PROBABILITY SERIOUS DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS		
1)HI DELINQUENCY	19 (10%)	11 (18%)	.58	8 (5%)	.42	9 (30%)	.47
2)MED DELINQUENCY	19 (10%)	11 (18%)	.58	8 (5%)	.42	8 (27%)	.42
3)NON-DELINQUENCY	162 (81%)	38 (63%)	.23	124 (90%)	.79	13 (43%)	.08
	N = 200	N = 60		N = 140		N = 30	

several improvements using Model B. First, efficiency is higher -- we now have a greater percentage of the future delinquents predicted as either high or medium delinquency (increase from 25% to 31%). The probability of delinquency for those predicted as delinquent has increased from .50 to .62, an improvement in accuracy. Simultaneously, using the model has increased general discriminatory power i.e. the degree of difference between the probabilities for delinquency (or non-delinquency) at opposite ends of the prediction continuum. Using perceived opportunity as a predictor, the difference between the probabilities of delinquency for those with low opportunity and for those with high opportunity is .25 (.50 - .25). Using the model, the difference in probabilities of delinquency has increased to .41 (.62 - .21). As well as the general discriminatory power increasing, the model also discriminates more clearly between serious and mild delinquents. Using perceived opportunity, the difference in probabilities of serious delinquency for those with low opportunity and those with high opportunity is .01 (.13 - .12), almost non-existent. However, using the model, the discriminatory power for serious delinquents is increased to .30 (the difference between probabilities of serious delinquency for those predicted as delinquent, .38, and those predicted as non-delinquent, .08). Finally, using the model, we put twice as many serious delinquents (16 instead of 8) into the categories predicted as high and

and medium delinquency, than fell into the two corresponding categories of low and medium perceived opportunity.

Considering all these factors, Model B is an obvious improvement as a predictor, over the single variable of perceived opportunity.

Let us look next at the comparison between teacher rating (TR) as a predictor, and the model (page 104). The single variable and the model have equally high efficiency and accuracy, but the model shows a slight improvement in general discriminatory power. The difference between probabilities of delinquency for opposite ends of the prediction continuum has increased from .17 to .20. Both predictors discriminate almost equally well between serious and mild delinquents, but using the model, a greater percentage of serious delinquents fall into the high delinquency category than are rated as bad by teachers (increase from 57% to 70%). Again we find that the model does as well or better in predicting, than the single variable, teacher rating.

In comparing the usefulness of the perceived expectations of others--peers (PEO1) and --parents(PEO2) with the model (pages 105 and 106), we find, using Model B an increase in efficiency and accuracy, higher general discriminatory power, greater discrimination between serious and mild delinquency, and finally, a greater percentage of serious delinquents in the 'high delinquency' prediction category in both cases of comparison.

In looking at the final variable, perceived expectations of others--teachers (PEO3), we again find the model a slightly better predictor. Both are equal in efficiency and accuracy, the model shows a slight improvement in general discriminatory power, and a few more serious delinquents fall into the 'high delinquency' category. The most obvious improvement using the model is in discrimination between serious and mild delinquency. The difference in probabilities of serious delinquency between opposite ends of the predicted continuum increases from .31 (.42 - .11) to .39 (.47 - .08) through the use of Model B.

Most of these improvements do not appear to be 'earth-shaking'. Yet the fact that they appear consistently for each comparison between the predictions of the single variables and the predictions of the model, gives strong support for our contention that a multi-variable prediction device can be (and is in the present study) an improvement over the use of single variables.

Let us recall that we have been discussing means of improving the utility of the preliminary model. The first two modifications, made to the general weighting system of the model, resulted in no improvement over Model B. Our second step was to discover if any of the single variables could be weakening links in the over-all model because of their poor predictive capacity as single variables, and to remove these. Having compared the predictive ability

of the single variables with the effectiveness of the model, we discovered that two of the variables were much poorer than the other five. Hence, we made the following modifications (ModB3) to Model B.

- a) We removed entirely, family cohesion, an act based on the variable's low efficiency and accuracy, and the complete reversal it demonstrated in the distribution of serious delinquents.
- b) We retained self-esteem, but with a modified weighting system.

	previous weights	present weights
High SE	.33	.33
Medium SE	1.00	1.00
Low SE	3.00	2.00

(This modification was justified by the fact, demonstrated in Tables 6 and 7, that low self-esteem does not seem to be as strongly related to delinquency, as high self-esteem is related to non-delinquency.)

The results of ModB3,

$$\text{DEL} = \text{PEO1} \cdot \text{PEO2} \cdot \text{PEO3} \cdot \text{PO} \cdot \text{SE} \cdot \text{TR}$$

are found in Table 9.

A quick perusal of Table 9 tells us that, according to our several criteria of evaluation, we have still failed to improve upon Model B. In fact, the results of ModB3 suggest that the removal of an explanatory variable, definitely takes away some of the predictive capacity of a multiplicative, multi-variable model, even though, on its own, that variable seems to have little predictive capacity. This observation seems to strengthen the possibility that interaction of variables improves the total model, even when individual factors seem 'unworthy' to become part of the model.

TABLE 9

RESULTS OF THE MODIFICATION OF PRELIMINARY MODEL B THROUGH CHANGES IN THE WEIGHTING SYSTEM, AND CHANGES IN THE COMBINATION OF VARIABLES, MOD B3

MOD B3

PREDICTIONS	NUMBER OF CASES	NUMBER--PROBABILITY OF DELINQUENTS	NUMBER--PROBABILITY OF NON-DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS
1)NON-DELINQUENT	114 (57%)	25 (42%) .22	89 (64%) .78	8 (27%) .07
2)RESIDUAL	43 (21%)	11 (18%) .25	32 (23%) .75	5 (17%) .12
3)DELINQUENT	43 (21%)	24 (40%) .56	19 (13%) .44	17 (57%) .40
	N = 200	N = 60	N = 140	N = 30

We have made several attempts to modify Model B by changing the weighting system and manipulating the combination of variables, with no improvements over the original model. In the process, we have also shown that the multi-variable model is a better predictor than any one of the single variables of which it is composed. Now let us take a look at a third possible reason for the weaknesses of the initial model, and a possible source of improvements in preliminary Model B.

Tests of Interaction: Interaction, as discussed briefly in the introductory chapter, simply means that the relation between two variables depends on the value of a third variable (Blalock, 1965). As used in statistical literature, interaction refers to non-additivity, and we had hoped to take any interaction into account through the use of a multiplicative model and a differential weighting system. However, the far-from-perfect predictive success with the preliminary model, and the lack of improvements through the use of modified weighting systems, prompted us to look further for hidden relationships of interdependence between the variables.

We wanted to discover if the relationship between each of our variables and delinquency, was different under varying conditions of each of the remaining factors in the model. The simplest means of illustrating our means of testing this, is through the following diagrammatic

examples. We start with a simple relationship between one of our single variables (ex. family cohesion), and delinquency involvement (police contacts, three years later). Gamma is used as a measure of the strength of association between the variables. (See Costner, 1965, for a discussion of the proper use of measures of association.)

Family Cohesion (FC)		Delinquency Involvement (D6)	
		Delinquent	Non-delinquent
	Low	35	64
	High	25	76

(N = 200)

Gamma = .23

To test first-order interaction (Blalock, 1965; Palmore and Hammond, 1964), we compute the relationship between these same two variables under two different conditions of a third or control variable. In this study, since we are concerned with variables which are related to delinquency, and how they combine to predict delinquency, we should be interested in the relationship between, for example, family cohesion (FC) and delinquency (D6), both when peers expect delinquency, and when peers do not expect delinquency. For example, we expand the original illustration above into the following.

Subjects whose peers expect delinquency

FC		D6	
		del.	non-del.
	Low	22	37
	High	15	26

(N=100)

Gamma = .02

Subjects whose peers expect non-delinquency

FC		D6	
		del.	non-del.
	Low	12	27
	High	10	50

(N=99)

Gamma = .38

These two tables tell us that when one perceives that his peers expect delinquency from him, the relationship between his family situation (family cohesion) and his delinquency involvement is almost nil. However, for subjects whose peers do not expect delinquency of them, their family situation and their delinquency involvement are much more strongly associated. We might stretch the logic of the explanation of the interacting effect or influence, and assert that for subjects whose peers expect delinquency, the variable, family cohesion (since its association with delinquency is almost nil under that condition) would have little or no capacity for predicting delinquency involvement. Hence, to find those instances in which the predictive utility of any of the variables is lowered by the influence of a third variable, we computed tests of first-order interaction for each variable (Table 10) i.e. we looked at the strength of association between each variable and delinquency involvement (measured by police contacts, three years later-D6), under two different control conditions of each of the remaining variables.

The numbers in Table 10 represent the gamma relationships between each variable and delinquency (D6) controlled for the 'delinquent' and 'non-delinquent' forms of each other variable. If we look down the first column under PE01-D, until we read across to Family Cohesion in the left-hand column of labels, we find a gamma of .02 which is the strength of association between family cohesion and delinquency.

TABLE 10

TESTS OF INTERACTION

INTERCORRELATIONS (measured by gamma) BETWEEN EACH VARIABLE AND DELINQUENCY
(defined as police contact three years later - D6), UNDER TWO CONDITIONS
OF EVERY OTHER VARIABLE

POLICE CONTACTS 1965-1967 (inclusive) D6												
	PEO1 D ND	PEO2 D ND	PEO3 D ND	FC LOW HI	PO LOW HI	TR BAD GOOD	LOW	HI	SE			
PEO PEERS (PEO1)	-- --	.21 .24	-1.00 .26	.15 .49	.36 .35	.20 .35	.35	.25				
PEO PARENTS (PEO2)	.20 .28	-- --	.21 .13	.27 .36	.34 .38	.23 .37	.43	-.19				
PEO TEACHERS (PEO3)	.37 1.00	.55 .49	-- --	.31 .74	.32 .69	.51 .17	.47	.53				
FAMILY COHESION (FC)	.02 .38	.12 .22	-.28 .33	-- --	.20 .29	.26 .25	.05	.34				
PERCEIVED GENERAL OPPORTUNITY (PO)	.23 .23	.25 .30	-.16 .35	.23 .32	-- --	.25 .16	.10	.40				
TEACHER RATING (TR)	.16 .31	.12 .27	.46 .12	.26 .25	.37 .28	-- --	.25	.25				
SELF ESTEEM (sum.) (SE)	.28 .18	.66 .14	.15 .23	.26 .39	.10 .40	.20 .20	--	--				

PEO Perceived expectations of others
D (expect) Delinquency
ND (expect) Non-delinquency

involvement for subjects whose peers expect delinquency from them. (This corresponds to the example used in our illustration of first-order interaction tests.) Looking down the second column under PEO1-ND, for Family Cohesion, we find a gamma of .38, the strength of association between family cohesion and delinquency, for subjects whose peers expect non-delinquency from them. (This also corresponds to the example used in the above illustration of first-order interaction.)

Our main interest then, is in the size of the difference between the degree of association (gamma) between two variables (ex. family cohesion and delinquency) under two different conditions of a third (ex. PEO1-delinquent and PEO1-non-delinquent). (For an elaboration of this method of defining interaction, see Lewis, 1962; Goodman, 1965; and Costner and Wager, 1965.) No test for the statistical significance of the size difference was employed, however, even though Costner and Wager (1965:456) warn that without significance tests, there is a danger of elaborately interpreting differences which are really nothing more than sampling fluctuations. The fact that our sample, which was very small, homogeneous, and non-random, did not meet the assumptions underlying tests of significance, forced us to choose an arbitrary value as the difference we would consider large enough to indicate interaction. Gamma can theoretically cover a range of 100 points (zero to +1.00 or zero to -1.00), but few

sociological variables are perfectly associated, either positively or negatively, narrowing the actual range of association considerably. We arbitrarily set our value at 30 points, i.e. if the strength of gamma for a relationship between two variables varied 30 points either way under different conditions of a third variable, we considered it an indication of interaction.

Let us take one example of our definition of interaction (i.e. a 30-point difference in gamma). If we look under the column titled SE to row 5, perceived general opportunity, we find a difference of 30 gamma 'points' between the strength of relationship of perceived opportunity and delinquency for subjects with low self-esteem (SE), .10, and the strength of the same relationship for subjects with high self-esteem, .40. We should automatically define this, then, as a case of interaction between the three variables of perceived opportunity, delinquency, and self-esteem.

However, in studying interaction, we have to insure, in some way, that the instances of interaction we find are not merely due to such things as sampling fluctuations (Costner and Wager, 1965), random measurement error (Blalock, 1965:44-45), or differences in operational definitions of the variables involved. It will be recalled that we chose the particular operational definitions of our variables because they were consistently, positively related to several different measures of delinquency involvement. We will again use several operational definitions of delinquency

to discover which cases of interaction seem to appear most consistently regardless of how we define delinquency.

Table 10 gave only the gamma values for the relationships between each variable and delinquency, defined as police contact, three years later-D6. The next step was to look at the relationships between each variable, and all the other operational definitions of delinquency,

- D1 Self-reported deviance
- D2 Police contacts of acquaintances
- D3 Court contacts of acquaintances
- D4 Counsellor referrals of subjects
- D5 Police record of subjects before 1965

under the two different control conditions (delinquent and non-delinquent) of the remaining variables. Since we were not ultimately interested in the actual values of gamma, but in the cases of interaction (as defined herein), we will simply summarize, in Table 11, the instances where interaction was found between the variables using the several definitions of delinquency.

In Table 11, a blank signifies no interaction; the positive and negative signs indicate instances of interaction. A positive sign also indicates that the strength of association (gamma) between a variable and (the particular definition of) delinquency is 30 or more points greater or stronger for the subjects in the non-delinquent category of the control variable, than for the 'delinquent' subjects. Likewise, a negative sign implies that the strength of association between a variable and delinquency is 30 or more points less or weaker for the subjects in the non-delinquent

SUMMARY OF INSTANCES OF FIRST-ORDER INTERACTION FOUND AMONG
THE VARIABLES AND DELINQUENCY USING SIX DIFFERENT
OPERATIONAL DEFINITIONS OF DELINQUENCY

INTERACTING VARIABLES	D1	D2	D3	D4	D5	D6	Total Cases POS.	NEG.
PE01-DEL-PE02			-		-			2
PE01-DEL-PE03		-	-	+	+	+	3	2
PE01-DEL-FC1						+	1	
PE01-DEL-PO3		+					1	
PE01-DEL-TR1								
PE01-DEL-SE2				-				1
PE02-DEL-PE01			-		-			2
PE02-DEL-PE03		+	+				2	
PE02-DEL-FC1		+					1	
PE02-DEL-PO3		+					1	
PE02-DEL-TR1			-	+			1	1
PE02-DEL-SE2			+	-		-	1	2
PE03-DEL-PE01	-	-	-	+	+	+	3	3
PE03-DEL-PE02		+	+				2	
PE03-DEL-FC1			+			+	2	
PE03-DEL-PO3		+		+		+	3	
PE03-DEL-TR1	+	-	-			-	3	1
PE03-DEL-SE2	+		+	-			2	1
FC1-DEL-PE01			+			+	2	
FC1-DEL-PE02		+		+			2	
FC1-DEL-PE03			+			+	2	
FC1-DEL-PO3	+		+	+			3	
FC1-DEL-TR1		-	-	+	-		1	3
FC1-DEL-SE2					+		1	
PO3-DEL-PE01		+	+				2	
PO3-DEL-PE02		+					1	
PO3-DEL-PE03				+		+	2	
PO3-DEL-FC1	+		+	+			3	
PO3-DEL-TR1	-							1
PO3-DEL-SE2	+					+	2	
TR1-DEL-PE01				+			1	
TR1-DEL-PE02	-		-					2
TR1-DEL-PE03	+	-	-			+	2	2
TR1-DEL-FC1		-	-					2
TR1-DEL-PO3	-		-					2
TR1-DEL-SE2	+	-		-			1	2
SE2-DEL-PE01	+			-			1	1
SE2-DEL-PE02			+			+	1	1
SE2-DEL-PE03	+			-		-	1	1
SE2-DEL-FC1					+		1	
SE2-DEL-PO3	+					+	2	
SE2-DEL-TR1	+	-		-			1	2

D1 Self Reported Deviance

D2 Police Contact of Acquaintances

D3 Court Contact of Acquaintances

D4 Counsellor Referrals

D5 Police Record 1964

D6 Police Record 1965-7

category of the control variable, than for the 'delinquent' subjects. For example, using self-reported deviance (column one) as the definition of delinquency involvement, we find the first instance of interaction (as we defined it) between family cohesion, delinquency, and perceived opportunity (FC--DEL--PO). The positive sign tells us that the strength of association between family cohesion and delinquency is much greater or stronger for subjects with high perceived opportunity (non-delinquent category of the control variable) than for those with low perceived opportunity (delinquent category of the control variable).

Using six different definitions of delinquency, we expected to find many inconsistencies. Hence we decided that if the same type of interaction (ex. all positive) was found between the same variables with at least three of the six (or 50% of the total) operational definitions of delinquency, we would consider these cases 'true' interaction, and not due to external sources of error.

Using this criterion, we found consistent interaction in only three cases, among the following sets of variables.

a) Family cohesion, delinquency and perceived general opportunity--

When PO is high, the relationship between FC + DEL is high.
When PO is low, the relationship between FC + DEL is low.

and the corollary,

When FC is high, the relationship between PO + DEL is high.
When FC is low, the relationship between PO + DEL is low.

Obviously, we are consistently getting interaction between the family situation and the opportunity structure, such that the presence of both variables tends to weaken the predictive capacity of each. The interaction could imply at least two explanations. First, if a subject perceives low legitimate opportunities (low PO), then the condition of his family situation has little compensating effect on his proneness to delinquency. Or secondly, if a subject has a bad family situation (low FC), the mere existence of general opportunities in the wider environment does not compensate for the influence of the earlier family environment i.e. the subject may not know how, or does not choose to take advantage of the opportunities. We cannot definitely say which logical explanation of the interaction between family cohesion and perceived opportunity is correct, but possibly we can speculate that since the family situation is logically prior in time to the general opportunity structure, the second explanation of interaction would be the better of the two.

b) Perceived expectations of peers, delinquency and perceived expectations of teachers--

When PEO-teachers is for non-delinquency, the relationship between PEO-peers and DEL is high.

When PEO-teachers is for delinquency, the relationship between PEO-peers and DEL is low.

and the corollary,

When PEO-peers is for non-delinquency, the relationship between PEO-teachers and DEL is high.

When PEO-peers is for delinquency, the relationship between PEO-teachers and DEL is low.

As in case a) above, the interaction is so consistent that the simultaneous presence of the variables, PEO-teachers and PEO-peers, in our prediction model probably weakens the predictive usefulness of each. The interaction here necessitates again, at least two explanations. First, at least, for the age range of our sample, it is possible that the expectations of teachers may have an overpowering influence on behavior if they are negative (i.e. expect delinquency), but if these expectations seem positive or neutral (i.e. expect non-delinquency), then expectations of peers are used as guideposts instead. Secondly, from this interaction, we might suggest that it is peer expectations which are so powerful when negative, while the expectations of teachers are influential only when peer expectations are positive. In each individual's case, the explanation of the interaction between peer and teacher expectations depends on

- a) which influence became important earlier in life, and
- b) whether the subject predominantly values 'group membership' or 'educational' and 'occupational' opportunities.

Whatever the explanation, we know that when the expectations of either one of teachers or peers is negative, the influence of the remaining 'other' will be greatly decreased. And in studying delinquent behavior, we would be more interested in the influence of the negative expectations (expect delinquency).

c) Perceived expectations of teachers, delinquency, and perceived opportunity--

When PO is high, the relationship between PEO-teachers and DEL is high.

When PO is low, the relationship between PEO-teachers and DEL is low.

and the corollary,

When PEO-teachers is for non-delinquency, the relationship between PO and DEL is high.

When PEO-teachers is for delinquency, the relationship between PO and DLE is low.

Were these two interacting variables, expectations of teachers and the general opportunity structure, to appear together in a prediction instrument, we could be fairly sure that the predictive capacity of each would be decreased. This interaction could have at least two possible explanations. First, if an individual already perceives few available opportunities in his environment (low PO), the positive expectations or hopes of his teachers will have little or no influence on his behavior. Secondly, if an individual sees that his teacher expects delinquency from him, he may never become aware of available opportunities and consequently the actual opportunity structure would have little or no influence on his subsequent behavior. This particular instance of interaction is probably closely related to the fact that, very often, teachers are the only source of information concerning the availability of general opportunities, so we might expect the negative expectations of a teacher for a pupil, to result in hiding or withholding knowledge or information about the opportunity structure.

In summary, then, we must somehow incorporate the interaction effects from the following three sets of variables, into our prediction instrument.

- a) FC -- PO
- b) PEO1 -- PEO3
- c) PEO3 -- PO

Final Modifications: We have said that if the two variables in each of sets a), b), or c) were to appear in a prediction instrument together, their joint presence may weaken the model, even though they are both related to delinquency. In attempting to overcome the weakening effects of this interaction, we made the following two modifications (Table 12) to the preliminary model. In ModB⁴, we removed entirely the variables, family cohesion (FC) and the perceived expectations of others-teachers (PEO3). In ModB⁵, we removed instead the variables, perceived expectations of others-peers (PEO1) and perceived general opportunity (PO). This resulted in the following two new models:

ModB⁴

$$\text{DEL} = x \cdot \text{PEO1} \cdot \text{PEO2} \cdot x \cdot \text{PO} \cdot \text{SE} \cdot \text{TR}$$

ModB⁵

$$\text{DEL} = \text{FC} \cdot x \cdot \text{PEO2} \cdot \text{PEO3} \cdot x \cdot \text{SE} \cdot \text{TR}$$

The weighting system was the same for both modifications 4 and 5, and was unchanged from preliminary Model B. Even before performing ModB⁴ and ModB⁵, we had doubts about the results. First, because experience with an

TABLE 12

RESULTS OF THE MODIFICATION OF PRELIMINARY MODEL B THROUGH THE REMOVAL OF INTERACTING VARIABLES

MOD B4

PREDICTIONS	NUMBER OF CASES	NUMBER--PROBABILITY OF DELINQUENTS	NUMBER-PROBABILITY OF NON-DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS
1)NON-DELINQUENT	97 (49%)	19 (31%)	78 (56%)	4 (13%)
2)RESIDUAL	58 (29%)	16 (27%)	42 (30%)	9 (30%)
3)DELIQUENT	45 (22%)	25 (42%)	20 (14%)	17 (57%)
	N = 200	N = 60	N = 140	N = 30

MOD B5

PREDICTIONS	NUMBER OF CASES	NUMBER--PROBABILITY OF DELINQUENTS	NUMBER--PROBABILITY OF NON-DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS
1)NON-DELINQUENT	91 (46%)	18 (30%)	73 (52%)	6 (20%)
2)RESIDUAL	68 (34%)	22 (37%)	46 (33%)	10 (33%)
3)DELIQUENT	41 (20%)	20 (33%)	21 (15%)	14 (47%)
	N = 200	N = 60	N = 140	N = 30

earlier modification (ModB3) showed that the mere removal of an explanatory factor simply weakens a multi-variable predictive instrument. Secondly, the fact that, in ModB5, we are removing what we originally hypothesized to be the two most influential variables, suggested the probable failure of this new model. However, we could not overlook the possibility that simply removing the interacting variables might strengthen our prediction device.

As Table 12 demonstrates, our doubts were well-founded. The simple removal of variables did not improve the predictive capacity of the preliminary model. Rather, it appears that merely removing variables destroys the whole effect of their interaction, a good deal of which seems to have been built into the preliminary model through the use of the weighting system and the multiplicative technique. Both ModB4 and ModB5 have less accuracy, less efficiency, and less discriminatory power than Model B.

The final attempt at improving the preliminary model by incorporating or taking into account the interaction summarized in Table 11, involved attaching two conditional or 'if' clauses to the preliminary model, rather than actually removing interacting. Based on the three cases of interaction found,

FC	--	PO
PE01	--	PE03
PE03	--	PO

we modified the preliminary model according to the following two conditions.

- 1) If perceived opportunity was low (i.e. a weight of 2 or over), the weights of family cohesion and the perceived expectations of others-teachers, were changed to 1 (i.e. they then had no influence in the model).
- 2) If the perceived expectations of others-teachers, was for delinquency(2 or over), the weight of the perceived expectations of others-peers was changed to 1 (i.e. also reducing its influence in the model to zero).

The results of this final modification are shown in Table 13.

Using ModB6, i.e. by taking into account the interaction found, we have made some final basic improvements over preliminary Model B (see Table 4). There is a slight increase in accuracy i.e. the probability for those predicted as delinquents of actually becoming delinquent has increased from .61 to .64. Simultaneously, the discriminatory power has increased. The difference between probabilities of delinquency for opposite ends of the predicted continuum has increased from .41 (.61-.20), to .45 (.64-.19). The efficiency is equally as high (both Model B and ModB6 picked out almost half of the future delinquents). Although ModB6 has the same percentage of serious delinquents falling into the 'predicted as delinquent' category, its power of discrimination between serious and mild delinquency has increased. In Model B, the difference between the probabilities for serious delinquency at opposite ends of the predicted continuum is .32 (.39-.07). Using ModB6, the difference increases to .35 (.41-.06). Finally, the 'residual' or unpredictable category in ModB6 contains the same percentage of the sample as found in the residual category using Model B.

TABLE 13

RESULTS OF THE MODIFICATION OF PRELIMINARY MODEL B BY INCORPORATING THE EFFECTS OF INTERACTING VARIABLES

MOD B6

PREDICTIONS	NUMBER OF CASES	NUMBER--PROBABILITY OF DELINQUENTS	NUMBER--PROBABILITY OF NON-DELINQUENTS	NUMBER--PROBABILITY OF SERIOUS DELINQUENTS
1)NON-DELINQUENT	108 (54%)	21 (35%)	87 (62%)	7 (23%)
2)RESIDUAL	50 (25%)	12 (19%)	38 (28%)	6 (20%)
3)DELINQUENT	42 (21%)	27 (45%)	15 (10%)	17 (57%)
	N = 200	N = 60	N = 140	N = 30

We have, in this chapter, proposed a preliminary prediction model, and then attempted to improve upon it through several types of modifications, ending with a final improved model, ModB6. The next chapter will outline one final method of evaluating our predictive model.

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CHAPTER SIX

EVALUATION THROUGH STEPWISE REGRESSION ANALYSIS

Introduction: It was mentioned earlier that the methods used to develop the model in this study would differ from those previously and habitually used in the development of devices for predicting juvenile delinquency. Usually, the following steps are followed. A sample is randomly chosen, and interest is focused on the task of finding out which variables are most strongly related to delinquency. Through multiple correlation analysis, the most significant variables are pointed out to the researcher and his attention then turns to attempts to predict the value of the dependent variable through the use of some combination of those variables which are significant for his particular sample. Through the method of multiple linear regression, the researcher can develop a 'best-fitting' prediction formula or equation for his sample which tells him how much the dependent variable changes with each unit change in the value of several independent variables, and hence he can predict values of the dependent variable under different conditions of the independent variables. The symbolic representation of the multiple regression equation is as follows,

$$Y = a + b_1 X_1 + b_2 X_2 + \dots + b_n X_n$$

where Y (the dependent variable) is explained in terms of

X_1, X_2, \dots, X_n (the independent variables), and a and b are constants. This is the usual method of developing a prediction formula.

Let us look at how the methods used in the present study differ slightly from above. We proceeded as follows. First, based on the theoretical assumptions found in the delinquency literature, seven variables were chosen to be included in the subsequently developed prediction device. On the basis of the fact that these variables played central explanatory roles in theories of delinquency, and the fact that together they formed a comprehensive social-psychological picture of the influences impinging on the individual, it was hypothesized that each variable would have some predictive capacity. The next problem was to find a method of combining these theoretical concepts or variables into a prediction device. Knowing that delinquency is a result of many interacting influences, we combined our chosen 'predictor' variables in a multiplicative rather than an additive relationship. (See Blalock, 1965 for a thorough discussion of interaction and nonadditivity.) Finally, to take into account the differential strength of the influence of each of the seven variables, we assigned a weighting factor to each variable. The actual numbers used in the weighting system were arbitrary, but the fact that some variables were weighted heavier than others was based on empirical evidence which has indicated that some variables are much more strongly related to

delinquency involvement than others. The symbolic representation of our final prediction device is as follows,

$$Y = (b_1 X_1) + (b_2 X_2) + \dots + (b_n X_n)$$

where Y, delinquency involvement, is explained in terms of the seven interacting variables, X1, X2, ... X7, and b is the constant weighting factor in each case. The last step was to choose a sample of subjects on which the prediction device could be tested.

A Final Evaluation: Now that we have developed, on the basis of theoretical assumptions, an effective prediction device, let us go back and find out how our model, theoretically applicable to any sample of male juveniles, compares to the 'best-fitting' prediction equation that we can statistically compute for our particular sample of subjects. In other words, we are now going to develop a prediction device for our sample via the methods most commonly used (i.e. regression analysis), with the exception that we are still going to start with our seven theoretically relevant variables, rather than choosing variables such as race, age, sex etc., merely because of their high correlations with delinquency (i.e. their power of discriminating between delinquents and non-delinquents).

The problem now is to find a statistical procedure which will calculate the best regression equation for our sample,

'best' implying

- a) the inclusion of enough of our independent variables to account for as much of the variance of the dependent variable as possible, and
- b) the inclusion of as few independent variables as possible because of the costs and impracticality of measuring large numbers of variables.

(Draper and Smith, 1966:163)

Let us recall that, earlier in the study, we assumed and later supported the fact that interaction exists between our variables. It is one thing to define the contribution of each of several uncorrelated factors to the variance of one dependent variable. However, when the factors are correlated, their contributions to the variance of the dependent variable can come directly, through individual impact, and/or jointly or indirectly, through their interaction with each other. Using the method of multiple regression to develop a 'best-fitting' prediction formula would be insufficient because the standard weighting factor (beta coefficient) acquired for each independent variable through this method, is computed by holding constant or controlling for each of the remaining independent variables considered in the regression equation. (See Blalock, 1960: 343-346, for a discussion of the beta coefficient.) Hence, the resulting regression equation would not include or reflect the contributions of a variable through its interaction with each of the other variables. As Hirschi and Selvin note:

"By themselves, the beta coefficients measure the 'direct' contribution of each independent variable to the dependent variable, but they do not take account of the 'indirect' contributions that each independent variable makes through its correlations with the other independent variables."

(Herschl and Selvin, 1967:157-158)

(See also Harman, 1960:338-348, regarding this matter.)

To take account of the above problem, we were led to the use of a regression procedure which provides a measure of the total (direct and indirect) contribution of each variable, the process of Stepwise Regression.

The Method of Stepwise Regression Analysis: According to Draper and Smith (1966:171-172), the stepwise regression procedure is an attempt to reach the best regression equation by inserting single variables in turn until the regression equation is satisfactory. The first variable inserted or selected for the equation is the one which accounts for the highest percentage of variance in the dependent or predicted variable. The order of insertion of the remaining variables is determined by using the partial correlation coefficient, (Blalock, 1960:329-336) as a measure of their importance. At every stage of the regression equation (i.e. at the addition of each new variable) a re-examination of the variables presently incorporated into the model, takes place. This procedure allows for the possibility that a variable which may have been the best single predictor to enter the equation at an early stage, may become superfluous at a later stage because of the interaction between it and other variables

now in the regression. At each step, then, a judgment is made on the contribution of each variable as though it had been the most recent addition to the equation, regardless of its actual point of entry into the model. Any variable which provides a non-significant contribution is then removed from the model, and this process of inserting a variable and checking on its contribution, is continued until no more variables will be admitted to the equation and no more are rejected. (See Efroymson, 1962, for a detailed outline of the computational process.) As the number of possible independent variables increases, the arithmetic labor involved becomes correspondingly heavier. To use the stepwise regression method on our seven variables by hand, or even with a calculator, would be impossibly cumbersome. However, this restriction on the usefulness of the method is lifted by the existence of computer programs which choose the order of the variables, compute the constant, and calculate the standard weight for each variable, all within a matter of minutes.

Results of the Stepwise Regression Method: Table 14 outlines the seven variables, starting with the one which explains the highest percentage of variance in the dependent variable, delinquency involvement (defined as the number of police contacts three years after the project). As well as the standard weight of each variable and its correlation with delinquency, we have noted the cumulative contribution of the variables (after the addition of each

TABLE 14

RESULTS OF STEPWISE REGRESSION ANALYSIS;
CORRELATIONS, STANDARD WEIGHTS AND REGRESSION EQUATION

VARIABLES---IN ORDER OF 'PERCENTAGE OF VARIANCE ACCOUNTED FOR'	PERCENTAGE OF VARIANCE ACCOUNTED FOR IN DEPENDENT VARIABLE (CUMULATIVE)	CORRELATION OF EACH VARIABLE WITH DELINQUENCY	STANDARD WEIGHTS
X1. TEACHER RATING	7.5387	--.2746	--.2218
X2 PERCEIVED EXPECTATIONS OF PEERS	10.3872	--.2281	--.1144
X3 SELF-ESTEEM	11.6909	.1738	.0977
X4 PERCEIVED OPPORTUNITY	12.4562	--.1428	--.0837
X5 PERCEIVED EXPECTATIONS OF TEACHERS	12.6495	--.2053	--.0504
X6 FAMILY COHESION	12.6740	--.0972	.0180
X7 PERCEIVED EXPECTATIONS OF PARENTS	12.6871	--.1581	--.0147

FINAL REGRESSION EQUATION:

$$Y = 3.276 + (-.2218X1) + (-.1144X2) + (.0977X3) + (-.0837X4) + (-.0504X5) + (.0180X6) + (-.0147X7)$$

successive factor) towards explaining the variance in the dependent variable. The percentage of the variance accounted for increases after each factor up to a maximum level of approximately 13%. By subtracting this cumulative contribution from an ideal level of 100% (i.e. together the variables explain all of the variance), we get a rough guide to the predictive capacity of this regression equation. In other words, since the combination of the seven variables leaves 87% ($100\% - 13\%$) of the variance of the dependent variable unexplained or unaccounted for, we should expect that a model based on this regression equation will have fairly poor predictive capacity.

Table 15 compares the predictions made by our final prediction model, ModB6, with the predictions made for our sample using the statistically 'best-fitting' regression equation which we have calculated. Since the weighting systems were different, the actual numerical raw score predicted for each case was also different from those using ModB6, but the distribution of the scores is what we are primarily concerned with. In order to make the distribution of predictions using the regression equation comparable to that of the theoretical prediction model (ModB6), we divided the distribution into three categories, each containing the same number of cases found in the comparable category of ModB6. As it turned

TABLE 15

COMPARISON OF PREDICTIONS MADE USING THE FINAL PREDICTION MODEL (ModB6)
AND THE 'BEST-FITTING' REGRESSION EQUATION.

MOD B6 PREDICTIONS	NUMBER--PROBABILITY OF DELINQUENTS			NUMBER--PROBABILITY OF NON-DELINQUENTS			NUMBER--PROBABILITY OF SERIOUS DELINQUENTS		
	NUMBER OF CASES	NUMBER OF DELINQUENTS	PROBABILITY	NUMBER OF DELINQUENTS	PROBABILITY	PROBABILITY	NUMBER OF CASES	NUMBER OF DELINQUENTS	PROBABILITY
1)NON-DELINQUENT	108 (54%)	21 (35%)	.19	87 (62%)	.81		7 (23%)	.06	
2)RESIDUAL	50 (25%)	12 (19%)	.24	38 (28%)	.76		6 (20%)	.12	
3)DELINQUENT	42 (21%)	27 (45%)	.64	15 (10%)	.37		17 (57%)	.41	
	N = 200	N = 60		N = 140			N = 30		

REGRESSION EQUATION PREDICTIONS	NUMBER--PROBABILITY OF DELINQUENTS			NUMBER--PROBABILITY OF NON-DELINQUENTS			NUMBER--PROBABILITY OF SERIOUS DELINQUENTS		
	NUMBER OF CASES	NUMBER OF DELINQUENTS	PROBABILITY	NUMBER OF DELINQUENTS	PROBABILITY	PROBABILITY	NUMBER OF CASES	NUMBER OF DELINQUENTS	PROBABILITY
1)NON-DELINQUENT	108 (54%)	22 (37%)	.20	86 (61%)	.80		7 (23%)	.06	
2)RESIDUAL	50 (25%)	15 (25%)	.30	35 (25%)	.70		8 (27%)	.16	
3)DELINQUENT	42 (21%)	23 (38%)	.55	19 (14%)	.45		15 (50%)	.36	
	N = 200	N = 60		N = 140			N = 30		

out, these division lines were also the best possible for maximizing the efficiency, accuracy and predictive power of the regression equation model.

A close comparison of the results using the two methods shows that ModB6, the prediction instrument developed in the present study, is superior to the statistically 'best-fitting' prediction equation calculated for our sample through regression analysis. Since the regression equation was developed strictly from the sample in the first place, there seems to be no plausible explanation for its failure to predict as well as or much better than, the theoretically-based model. However, as one can see, both the accuracy and efficiency of the theoretical model (ModB6) are higher than those of the regression equation. The general predictive or discriminating power of ModB6 ($.64 - .19 = .45$) is greater than that of the regression equation ($.55 - .20 = .35$), as well as the power of the theoretical model to discriminate between serious and mild delinquency being greater (.35 compared to .30 for the regression equation). Finally, a higher percentage of serious delinquents are predicted as future delinquents by ModB6 (57%) than by the use of the regression equation (50%).

Starting with theoretical assumptions and proceeding through several modification and evaluation steps, we have developed an effective instrument for predicting delinquency.

The next and final chapter, after a short summary, discusses some of the problems involved in this process of developing a prediction instrument, and some of the implications of this type of study.

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CHAPTER SEVEN

CONCLUSIONS AND IMPLICATIONS OF THE STUDY

Summary: Recent research on delinquency (Palmore and Hammond, 1964; Short, Riviera and Tennyson, 1965; and Stanfield, 1966) has suggested and supported the fact that interaction exists among many of the variables previously related singly to delinquency. The results of these studies demonstrate that explanation and prediction in terms of direct causal analysis is inadequate. It has been suggested (Tangri and Schwartz, 1967) that the time is ripe for an attempt to join all the major variables which have been 'causally' linked to delinquency, in a model which will take into account their interactions. Hence, rather than deal with the detailed interaction of one or two variables, this study has attempted to look at the interaction among several variables (each representing a major area of delinquency theory), and to develop and test a prediction device through the combination of these variables in a multiplicative model. We have completed the following steps in the development of our prediction instrument.

1. Choice of variables: Seven variables were chosen on the basis of their importance in delinquency theories and the literature on deviance, and because together they formed a comprehensive social-psychological picture of the influences on man's behavior. Each was assumed

to have an explanatory function and hypothesized to have a predictive capacity concerning an individual's involvement in future delinquency. Five of the variables had multiple operational definitions.

2. Initial Correlations: The strength of association between each variable (i.e. each operational definition of a variable) and each operational definition of delinquency involvement was measured by gamma. On the basis of the initial correlations, the operational definitions which were most weakly linked to delinquency (DEL) were eliminated from the model. Differential weights were assigned to the variables depending on the hypothesized strength of their influence on behavior. The following preliminary model resulted.

$$\text{DEL} = \text{FC} \cdot \text{PEO1} \cdot \text{PEO2} \cdot \text{PEO3} \cdot \text{PO} \cdot (\text{SE1})\text{or}(\text{SE2}) \cdot \text{TR}$$

3. The Preliminary Model: Testing of the preliminary model resulted in the elimination of SE1 as a poor predictor variable, leaving Model B (as above without SE1), as the final and better preliminary prediction model. Model B showed encouraging results, basically supporting the initial weighting system by demonstrating the expected trend that the most delinquent (defined as those with police contact, three years later) generally had the highest scores, while the non-delinquents fell into the lower score ranges.

4. Modifications of the Preliminary Model: First, three modification attempts were made by changing the weighting system and removing one variable which, on its own, was found to have no predictive capacity. None of these attempts resulted in improvements over preliminary Model B. Secondly, predictions made for the sample using five of the single variables separately, were compared with predictions made by the model to discover if a single variable could predict more effectively than a multi-variable instrument. The instrument did better than any of the variables of which it was composed. Thirdly, tests of first-order interaction were carried out to discover if the relationship between any one of the predictor variables and delinquency was different under different conditions of any of the remaining variables. Interaction, (as herein defined), was found between Family cohesion and perceived opportunity, Perceived expectations of peers and perceived expectations of teachers, and Perceived expectations of teachers and perceived opportunity. Two further modifications were then made to Model B by removing the interacting variables from the instrument as follows.

$$\text{DEL} = x \cdot \text{PEO1} \cdot \text{PEO2} \cdot x \cdot \text{PO} \cdot \text{SE} \cdot \text{TR}$$

$$\text{DEL} = \text{FC} \cdot x \cdot \text{PEO2} \cdot \text{PEO3} \cdot x \cdot \text{SE} \cdot \text{TR}$$

Neither of these attempts resulted in any improvements in the preliminary model. Finally, Model B was modified through the use of two conditional or 'if' clauses, so

that the influence of a strong variable was not lost by removing it, as in ModB4 and ModB5 above, and the influence of a weak variable was merely discounted or made equal to zero in the presence of a stronger one with which it was interacting. This modification, ModB6, did show distinct improvements over Model B, and was termed the best and final prediction instrument.

5. Final Evaluation: The final step in the study was a comparison between the predictions made by our theoretically-based model (ModB6) and those made through the use of a 'best-fitting' regression equation, calculated for our sample by the method of stepwise regression (fully discussed in chapter six).

Conclusions: In the present study, we have succeeded in developing a multi-variable prediction instrument which predicts future delinquency better than chance, better than any of the single variables of which it is composed, and better than the 'best-fitting' regression equation for our particular sample. Secondly, we have overcome one of the basic criticisms of prediction studies (i.e. the over-emphasis on technique with subsequent lack of theory), by using explanatory variables from theories, and by outlining, in some detail, what role each variable supposedly plays in influencing behavior. Thirdly, the moderate success of the prediction device developed here has served to verify the utility of combining inter-level, inter-disciplinary concepts and theories in studying the

behavioral dynamics of delinquency. Fourthly, the multiplicative technique, which replaces the additive technique commonly used in prediction studies, appears to have successfully taken into account or incorporated both the main and interaction relationships between the variables and delinquency. Fifth, most prediction devices can correctly predict only the most extreme ends of their score continuum but leave a very large 'unpredictable' category in the middle scores. The prediction device developed in the present study predicted much better than chance for 75% of the total sample, leaving only 25% or 1/4 of the sample in the residual category. Finally, the final prediction model demonstrated useful discriminatory power concerning both delinquents vs. non-delinquents, and serious vs. mild delinquency. The differences between the calculated probabilities of delinquency (and non-delinquency), and serious delinquency, at opposite ends of the predicted continuum were consistently and meaningfully large.

Shortcomings of the Study: The most obvious, and from the practical point of view, serious shortcoming of the study lies in the fact that the prediction instrument developed is not 100% perfect. When tested on our sample of known delinquents and non-delinquents, the prediction device made errors. We could suggest several reasons (or excuses) for these errors. First, we know that reasons for delinquency vary from individual to individual, and even though we have claimed to use factors which

theoretically should all influence all individuals, some of the factors are bound to be more influential with some people than with others. However, we had to assume that each factor was universally influential, and influenced everyone to the same extent, giving us one possible source of prediction errors.

Another source of error may lie in our choice (or exclusion) of variables. It is obvious that, in predicting future delinquency involvement, we cannot make use of immediate situational factors. The lack of explanations for such facts as

- 1) many delinquent kids in 'good' environments, and
- 2) many non-delinquent kids in delinquency-inducing environments,

leads to an ever-increasing stress on the importance of situational contingencies or immediate situational stimuli in the influence of behavior. Hence, some of our error may be directly explained by our exclusion of these situational contingencies which are influential, yet unknown and unavailable in developing or using prediction devices.

Still dealing with the exclusion of variables, Cloward and Ohlin (1960) have suggested that while delinquency can result from restricted legitimate opportunities (which we measured), the likelihood and direction of delinquency probably depend more directly on accessibility of illegitimate opportunities. Even though a study by Palmore and Hammond (1964) gives some support to this idea, our model did not take into account

the differential availability of illegal avenues for goal attainment. This factor may have greatly increased the predictive capacity of the present device. Also, we failed to measure the extent to which general societal goals were actually desired by our sample. In other words, the amount of motivation to achieve goals may be an important factor in whether or not the perceived opportunity structure has any influence on behavior. Again, we failed to include a variable (motivation) which might, in interacting with perceived opportunity, have sharpened the predictive power of our model.

On the other hand, by including self-esteem, we may have inadvertently weakened our model. The basic reason for including this variable was the possibility (Liu, 1963) that, where opportunity structure and other variables are constant, 'self-esteem' may explain why some make use of opportunities and others do not. However, the dynamics of the complex relationships between self-esteem and social-structural variables have never been clearly outlined. For example, we could speculate that low self-esteem is related to adolescent withdrawal from parents and subsequent loss of status and social support. On the other hand, we might say that only adolescents with high self-esteem can 'afford' to withdraw from parents. As another example we might say that anyone engaged in delinquent behavior would have low self-esteem, since delinquency is generally frowned upon

in our society. Hall (1966) suggests that this depends on how involved an individual is; the confirmed delinquent would most likely have high self-esteem. We can see that the usefulness of self-esteem as a predictor variable depends greatly on exactly how it interacts with other influences, and at what point in the development of an individual, we measure his self-esteem. We can be fairly sure that self-esteem acts as a 'closure-factor' (Lemert, 1953) i.e. restricts possibilities of behavior to a particular universe, but we need much further study to determine, within that restricted universe, which behaviors will be chosen and which will not, and how and if self-esteem influences the choice. For example, self-esteem may be of slight importance in the causation of delinquency involvement, but may be decidedly important in the renewal or continuation of delinquency. This suggests the use of self-esteem in predicting recidivism rather than first offenses.

Another example of the confusion over self-esteem concerns a finding by Barbara Lorch (1966) that level of self-esteem is not as important in influencing behavior as whether or not we perceive 'others' opinions of us to be congruent i.e. all the same, whether good or bad. The particular operational definition of self-esteem (SE2) which was used in the final model dealt with the opinions of others. SE2 was an average

of the summary of three significant others' opinions of the subjects. However, by averaging these three scores to come up with a final rating, we would be, according to Lorch, hiding or discounting the possible stronger influence of the congruity or lack of congruity between these three opinions. If Lorch's suggestion had been correct, then our definition of self-esteem (SE2) would have decreased the predictive power of the model. Hence, we decided to look at the congruency of others' evaluations of our subjects, divided according to delinquency involvement (i.e. the behavior we are trying to predict), and we got the following distribution. Parents', teachers', and peers' evaluations were congruent for

13/30 or 43% of the serious delinquents
 29/60 or 48% of the delinquents and
 70/140 or 50% of the non-delinquents.

Although the very small differences in percentages might lead us to question her notion that congruity of others' opinions has any strong influence on behavior, or at least the behavior we are interested in predicting, the trend supports Lorch's idea. (The most serious delinquents perceived less congruency among others' evaluations of them.) These findings lead us to suspect that including our particular definition of self-esteem may have increased prediction errors.

We have just looked at how the inclusion (or exclusion) of particular variables may have been a possible source of error in our prediction device. Another probable reason

for lack of perfection in the instrument concerns the questionable accuracy of the measure of predicted delinquency. i.e. the number of police contacts-three years later. First, there is the possibility that many delinquent acts are unknown to the police. Secondly, using police records from only one particular place makes it impossible to differentiate between subjects who legitimately had no contacts with the police, and those who had moved away and may have had police records elsewhere. Since our sample was taken from low-rental housing projects, we can probably assume that a large percentage of the residents may be transient or mobile. Hence, we have no idea how many of our records were actually incorrect, and so resulted in what appears to us as incorrect predictions.

We can suggest one final factor which may have dulled the predictive power of the model. In the present study, as in most social science research, one can almost always question the validity of the operational definitions used. The links between the operational definitions and the concepts may be very tenuous; for example, perceived school opportunity may be measuring some form of aspiration level as well. However, to entirely explain away prediction errors by claiming impurity of the measures is to admit the possibility that correct predictions are also open to question, since both are based on the same measures of the concepts. Hopefully, we reduced possible errors due to poor operational definitions, by being able to choose

the 'best' from multiple measures of the concept.

We have looked at possible explanations for the first shortcoming i.e. the less-than-100% effectiveness of the instrument. There are several other shortcomings of the study. In the environment of empirical sociology, one might be questioned about the lack of tests of significance. However, since known delinquent behavior is relatively infrequent in the general population, its relationship to antecedents is not likely to be manifested with statistical significance unless samples are extremely large, or specially selected so that the group in which the delinquency is manifested approaches about half (50%) of the total sample. Our sample was specifically selected (basically lower class) to include more delinquents than we might find in a general population sample, yet still was only about 30% (or 60/200) delinquents. Also, our predicted delinquency measure (police contacts-three years later), dealing only with officially recognized delinquency, probably under-rated the degree of actual delinquency in our sample, and so would decrease our chances of finding statistically significant relationships between delinquency and the other variables in the model. Finally, the shortcomings of the data itself (i.e. non-random basis of selection and small sample size) preclude the legitimate use of tests of significance. Hence, we cannot generalize the findings of the present study, but can only assert that they are substantively suggestive.

Finally, our results are still plagued by the existence of the residual or unpredictable group of subjects, even though it only includes about 1/4 of the sample. One might question the use of a residual category in the middle of a scale or continuum from high delinquency to low delinquency. Admittedly, the model produces a continuum of scores from zero to infinity, but when we translate those scores into actual predictions, using the probabilities of delinquency, we consistently find that the predictions for the middle category (i.e. the middle of the score range) are no better than chance, while the probabilities at opposite ends of the score range are improved enough over chance that we can afford to distinctly predict 'delinquent' and 'non-delinquent'. Also, though most delinquency theories are formulated in terms of continuous variables, our crude measuring instruments make simple categorizations seem advisable in handling empirical data. Looking at the instrument from a practical point of view as well, it seems much more effective to label a subject simply unpredictable, than to say his probability of delinquency involvement is medium, 'so-so' or chance. Realistically, in dealing with individual cases, potential users will want an instrument that will tell them 'yes', 'no', or unpredictable.

Implications: The development of a predictive model of delinquency which incorporates the interaction of both

social and personality variables fills a substantive void in the study of deviance. Just as the social influence has been neglected by psychologists, the individual factor has been ignored by sociologists. By combining structural variables with 'self-other' factors, this study has attempted to 'plant seeds' in a very fertile area concerning the interaction of these variables. Reckless has said;

"The operation of the factors in the instrument should be visible or traceable in individual cases, and should be recognizable by behavioral scientists, psychiatrists, psychologists, and sociologists."

(Reckless, 1967:396)

Hopefully, our choice of inter-disciplinary variables has helped to fulfill these two criteria.

Secondly, a social-psychological predictive model may have implications for the understanding of deviant behavior by those people involved in the processing of apprehended delinquents. The development of an effective predictive model of the type proposed herein, although it might not be used in its present form, could force 'practitioners' to seriously consider the idea that delinquent behavior is a result of the complex interaction of many factors, operating at different stages of the individual's development, and with different degrees of influence, and to apply these ideas in their work (rather than the traditional neo-Freudian approach to clinical problems).

Thirdly, since a prediction model does not specifically

connect the sequence between predispositions and delinquent behavior, it cannot fortify any existing causal claims. However, by testing the effectiveness of the variables involved (in our case, variables which all play important explanatory roles), a prediction device can serve as an indirect test of several theories, and so may have implications for the construction of a causal model at a later date. If the variables in a prediction device are based on theoretical assumptions, then the proposal of a causal theory from the model may be relatively simple. Also, by using 'multi-level' variables as we have done in the present study, and since the actions involved in delinquency are in no way exclusive to deviance alone, it may be possible to generalize or abstract the model in order to extend its applicability from deviant behavior to include other forms of behavior.

Fourth, and finally, it has been suggested (Gould and Schrag, 1962; Amos and Wellford, 1967) that at present, predictive models function best as evaluators of the applicability of theories and of the effectiveness of action programs. A good predictive model today will enable the researcher to decide in which areas theoretical development or action should be intensified or decreased. The philosophy underlying most of today's delinquency programs is rehabilitation. It is true that

" We are repair minded. When the problem does crop out, ... we find ourselves in the position of putting a poultice on the wounded area, of doing too little, too late. (Many people) have shown the wastefulness, the inefficiency of that approach. Attacking the problem after it has become manifest and unduly severe ... involves the creation of many different types of services and agencies which duplicate effort, raise costs and magnify the public debt. ...permanent 'cures' are few and the recurrence percentage is high.

The sciences of behavior must arrive at a preventative approach."

(A. Herman as quoted by Whelan, 1956:432)

It is clear then, that ultimately we should be striving for delinquency prevention, and prevention necessitates prediction. Once improved and perfected, prediction models of the future (possibly similar to the one developed in the present study) will play central roles in the 'science' of prevention. In a small way, then, the present study has implications and contributions for the future.

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APPENDIX

Selected Questionnaire Items

A. Modified Nye-Short self-report scale:

	<u>Often</u>	<u>Some- times</u>	<u>Never</u>
1. Drive a car without a driver's license*.....	1	2	3
2. Skip school without an excuse*.	1	2	3
3. Disobey parents' authority (to their faces).....	1	2	3
4. Take little things that do not belong to you (worth less than \$2.00)*.....	1	2	3
5. Buy or drink beer, wine or liquor (including drinking at home)*.....	1	2	3
6. Run away from home.....	1	2	3
7. To on purpose damage or destroy things which do not belong to you*.....	1	2	3
8. Threatening kids for money.....	1	2	3
9. Beating up on kids who haven't done anything to you.....	1	2	3

* The asterisk indicates those items reported to discriminate between delinquents and non-delinquents, by Nye and Short, "Scaling Delinquent Behavior" American Sociological Review 22 (June) 1957:326-31
The remainder of the items were added for use in the Opportunities for Youth Project from which our data comes.

B. Family Cohesion Scale:

"The following questions are about you and your parents. If your answer to the question is yes, circle (1); if your answer is no, circle (2)."

	<u>YES</u>	<u>NO</u>
1. Do you enjoy telling your parents about good times?.....	1	2
2. Do you enjoy talking over your plans with your parents?.....	1	2
3. Is it true that what your parents don't know won't hurt them?.....	1	2
4. Do you enjoy doing extra things you don't have to do to please your parents? 1		2
5. Do you tell your parents when you get into some kind of trouble?.....	1	2
6. Do you often feel angry at your parents? 1		2
7. In general, do you feel that you get a 'square deal' with your parents?.....	1	2
8. Do you think "Oh, what's the use" after you have tried to explain to your parents about something you've done?....	1	2
9. Are you interested in what your parents think of you?.....	1	2
10. Are your parents interested in what you do?.....	1	2
11. Do your parents encourage you to discuss your problems with them?.....	1	2
12. Do your parents make fun of your ideas?. 1		2
13. Have you ever felt ashamed of your parents?.....	1	2
14. If it were possible to change real parents,into ideal parents, would you change your parents?.....	1	2

Family cohesion continued--

	<u>YES</u>	<u>NO</u>
15. Do you think your parents have your best interests at heart?.....	1	2
16. Do your parents show more interest in your brothers and sisters than they show in you?.....	1	2
17. Do other parents show more interest in their children than yours show in you?	1	2
18. Do your parents praise you when you do your work well?.....	1	2
19. Do your parents ever seem to wish you were a different sort of person?..	1	2
20. Do you think your parents try to understand your problems and worries?.	1	2
21. Do your parents punish you when you don't deserve it?.....	1	2
22. Does your family do anything special for your birthday?.....	1	2
23. Does your family give you birthday presents?.....	1	2

C. Social Class:

"What is your father's (or stepfather's) job?

Circle the one that is closest."

1. Skilled worker (carpenter, electrician, plumber)
2. Unskilled worker (night watchman, waiter)
3. Semi-skilled worker (machine operator, taxi driver)
4. Owner or manager of a large business
5. Sales clerk, salesman or office worker
6. Professional (doctor, lawyer, teacher)
7. Farmer, Rancher, Fisherman or Miner
8. Gardner
9. Owner or manager of a small business

Numbers 1, 2, 3, 7, and 8 were classified as lower class.
 Numbers 5, and 9 were classified as middle class.
 Numbers 4, and 6 were classified as upper class.

D. Self-esteem--Discrepancy Score Between How You See Yourself (real self) and How Important It Is To Be That Way (ideal self). (SE3)

Question 1:

"How about you? How do you see yourself?"

Reliable 1 2 3 4 5 6 7 Not reliable

Foolish 1 2 3 4 5 6 7 Wise

and so forth with the following pairs of adjectives.

Ambitious	-	Not Ambitious
"Cool"	-	"Square"
Daring	-	Cautious
Hard to get along with	-	Easy to get along with
Grown up	-	Childish
Lazy	-	Hard Working
Honest	-	Dishonest
Smart	-	Dumb
Tough	-	Weak
A good student	-	A poor student
Loyal	-	Not loyal
Good at getting people to do things for you	-	Poor at getting people to do things for you
Generous	-	Selfish
Sensible	-	Not sensible

Question 2:

"How important is it for a boy like you to be Reliable?"

Very important 1 2 3 4 5 6 7 Not important

"to be Ambitious?"

"to be "Cool"?" and so forth for the following adjectives.

--daring	--act grown-up
--easy to get along with	--a good student
--hard working	--good at getting people to do things for you
--honest	--generous
--smart	--loyal
--tough	

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